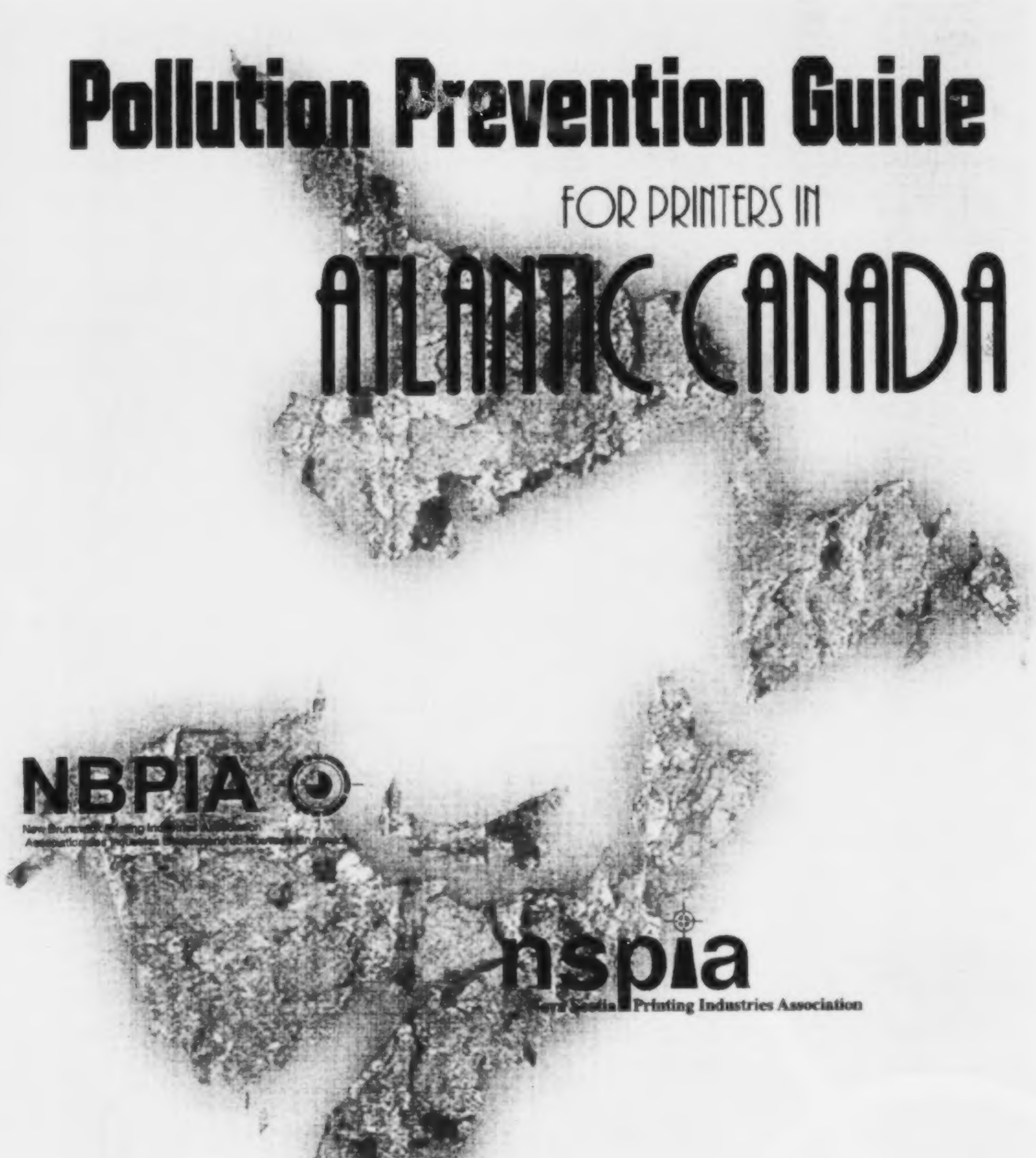
Pollution Prevention Guide

FOR PRINTERS IN ATLANTIC CANADA



NBPIA
New Brunswick Printing Industries Association
[illegible]

nspia
Nova Scotia Printing Industries Association

NOVA SCOTIA
Department of the Environment

New Nouveau Brunswick

NEWFOUNDLAND AND LABRADOR

Prince Edward Island
Technology and Environment

HALIFAX
REGIONAL MUNICIPALITY

Nova Scotia

Eco-Efficiency Centre
In Burnside

Environment Canada
Environnement Canada

Pollution Prevention Guide for Printers in Atlantic Canada (May 1999) is designed to be updated on a page-by-page replacement system. Updates and amendments will be mailed to printers in Atlantic Canada periodically. Please ensure your printing association has the correct mailing address. If you do not belong to an association, please forward your correct mailing address to:

Rodger Albright
Environmental Management and Technology Section
Environment Canada
16th Floor, Queen Square
45 Alderney Drive
Dartmouth, NS
B2Y 2N6
Tel: (902) 426-4480
Fax: (902) 426-8373
Email: rodger.albright@ec.gc.ca

Please use the following table to ensure that your Guide is up to date.

Section	Date of Amendment	Replace Pages:

For additional information and copies of this guide contact:

Mr. Louis Poirier, President
New Brunswick Printing Industries Association
c/o Minuteman Press
236 St. George Street, Suite 1
Moncton, New Brunswick
E1C 1W1
Tel: (506) 855-5553
Fax: (506) 855-5565
Email: louisp@fundy.net

Mr. Peter Andresen, President
Nova Scotia Printing Industries Association
c/o McCurdy Printing Limited
140 Joseph Zatzman Drive
Dartmouth, Nova Scotia
B3J 2X1
Tel: (902) 457-7468
Fax: (902) 468-4559
Email: pandresen@mccurdy.ns.ca

Mr. Rodger Albright
Environmental Management and Technology
Environment Canada
45 Alderney Drive
Dartmouth, Nova Scotia
B2Y 2N6
Tel: (902) 426-4480
Fax: (902) 426-8373
Email: rodger.albright@ec.gc.ca

Ms. Lynda Rankin
Pollution Prevention Section
Nova Scotia Department of the Environment
P.O. Box 2107
Halifax, Nova Scotia
B3J 3B7
Tel: (902) 424-2578
Fax: (902) 424-0503
Email: rankinlx@gov.ns.ca

Notice

This manual provides advice on the benefits of prevention pollution in the printing industry. It also provides advice on how to comply with some of the relevant laws in effect in Atlantic Canada. It does not provide information and advice on how to comply with all provisions of environmental acts and regulations which may apply to the printing industry. This manual is not intended to replace reading environmental acts and regulations or seeking advice from a lawyer or an environmental expert. Examples given and interpretations placed on sections of various environmental acts and regulations are not binding on the Crown or the Queen. Amendments may be made to acts or regulations after the publication of this document and reference should be made to the most recent official version of acts and regulations.

106-05442/

Preface

The Atlantic Green Printers Project (AGPP) is a joint industry-government initiative which began in January 1999 to assist the printing and graphics industry to reduce operating costs using a pollution prevention framework. The *Pollution Prevention Guide for Printers in Atlantic Canada* is the first of four phases which make up the AGPP. Other phases of AGPP include local training seminars, presentation of the *Pollution Prevention Guide for Printers in Atlantic Canada* at *"Print Green, Less Waste, More Profit!"* seminar at the Atlantic Graphic Trade Show (May 16th and 17th, 1999), and a follow-up program aimed at helping printers to develop a site specific environmental management systems which will reduce operating costs and prevent pollution.

The AGPP steering committee consists of:

- New Brunswick Printing Industries Association (NBPIA) - Mr. Louis Poirier, President
- Nova Scotia Printing Industries Association (NSPIA) - Mr. Peter Andresen, President
- Eco-Efficiency Centre in Burnside - Ms. Peggy Crawford Kellock, Co-ordinator
- Pollution Prevention Section, Nova Scotia Department of the Environment - Ms. Lynda Rankin, Pollution Prevention Specialist
- Halifax Regional Municipality (HRM) - Mr. Naipal Tomar, Senior Environmental Engineer
- Halifax Regional Municipality (HRM) - Mr. Tony Blouin, Principal, Environmental Issues and Initiatives
- Pollution Prevention Division, Environment Canada - Mr. Rodger Albright, Head of Environmental Management and Technology
- Pollution Prevention Division, Environment Canada - Ms. Kay Kim, Pollution Prevention Advisor

Pollution prevention planning is a new approach to doing business that lowers your health, safety and environmental risks, while enabling your business to become more efficient and more competitive. Based on preventing pollution rather than managing waste, effluent and emissions, pollution prevention (P2) is a huge step towards developing a sustainable business.

The *Pollution Prevention Guide for Printers in Atlantic Canada* walks you through all of your business processes, gives you an opportunity to evaluate your current practices and offers practical tips for improving efficiency and reducing environmental impacts. This manual also provides you with general guidance and a list of contacts that will assist you to comply with current Federal, Provincial and Municipal Legislation.

Acknowledgements

The *Pollution Prevention Guide for Printers in Atlantic Canada* was developed in cooperation with the Eco-Efficiency Centre in Burnside, Pollution Prevention Section of Nova Scotia Department of the Environment, New Brunswick Printing Industries Association, Nova Scotia Printing Industries Association and Environmental Management and Technology Section of Environment Canada.

This training guide is based on *Manitoba Pollution Prevention Guide for Printers (1998)*, and The Nova Scotia Printing Industry Association's *Environmental Management Manual and Resource Guide* (1995), and we gratefully acknowledge the Manitoba Technical Assistance for Pollution Prevention (TAPP) Office and NSPIA for giving us the permission to use their documents.

We would like to thank the following agencies for providing valuable regulatory information:

Newfoundland and Labrador Department of Environment and Labour
New Brunswick Department of Environment
Nova Scotia Department of the Environment, Pollution Prevention Section
Nova Scotia Department of Labour
Prince Edward Island Department of Fisheries and Environment
Halifax Regional Municipality, Nova Scotia
City of Saint John, New Brunswick
City of St. Jonn's, Newfoundland
City of Charlottetown, Prince Edward Island
Environment Canada, Environmental Management and Technology Section

A special thanks is also extended to Ms. Marcie Kinter (Screenprinting and Graphic Imaging Association International) and Mr. Robert Fredrico (Jacques Whitford) for providing valuable technical information and suggestions on improving this document.

We also would like to thank McCurdy Printing and WebAtlantic for providing editorial services.

The printing of this manual was done by NBPIA and NSPIA.

Permission for reproduction should be directed to:

Mr. Rodger Albright
Environmental Management and Technology Section
Environment Canada
45 Alderney Drive
Dartmouth, Nova Scotia
B2Y 2N6
Tel: (902) 426-4480
Fax: (902) 426-8373
Email: rodger.albright@ec.gc.ca

Abbreviations

AGPP	Atlantic Green Printers Project
ARET	Accelerated Reduction/Elimination of Toxics Program
AST	Aboveground Storage Tank
BOD	Biochemical Oxygen Demand
CEAA	Canadian Environmental Assessment Agency
CFC	Chlorinated fluoro carbons
EC	Environment Canada
EMS	Environmental Management System
HRM	Halifax Regional Municipality
IPA	Isopropyl Alcohol
ISO	International Organization for Standards
MSDB	Municipal Sewer Discharge Bylaw
MSDS	Material Safety Data Sheet
NBPIA	New Brunswick Printing Industries Association
NOx	Nitrous Oxides
NPRI	National Pollutant Release Inventory
NBDOE	New Brunswick Department of Environment
NSDOE	Nova Scotia Department of the Environment
NSPIA	Nova Scotia Printing Industries Association
PCB	Polychlorinated Biphenyls
PEIDOE	Prince Edward Island Department of Fisheries and Environment
ODS	Ozone Depleting Substances
TDG	Transportation of Dangerous Goods
TDGA	Transportation of Dangerous Goods Act
UST	Underground Storage Tank
VOC	Volatile Organic Compounds
WHMIS	Workplace Hazardous Materials Information System

Table Of Contents

SECTION 1. BENEFITS OF POLLUTION PREVENTION 1-1
The Printing Industry 1-1
How Your Business Affects the Environment 1-1
How the Environment Affects Your Business 1-2
Due Diligence 1-2
Pollution Prevention and Your Profitability 1-3
Your Pollution Prevention Tools 1-3
EcoLogo and the Environmental Choice Program* 1-4
Using the Checklists 1-5
Legal Requirements 1-5
Marking Your Answers 1-5
Getting More Information 1-5

SECTION 2. BEST PRACTICES AND COMPLYING WITH REGULATIONS 2-1
2.1 Federal Requirements
National Pollutant Release Inventory (NPRI) 2-2
Accelerated Reduction/Elimination of Toxic Program (ARET) 2-2
Managing Polychlorinated Biphenyls (PCBs) 2-2
Asbestos 2-2
Ozone Depleting Substances (ODSs) 2-2
Volatile Organic Compounds (VOCs) 2-2
Guidance 2-3

2.2 Provincial Requirements
Spills to the Outside Environment 2-6
Handling Controlled Products 2-7
Off-Site Hazardous Waste Management 2-8
Air Emissions Management 2-9
Solid Waste Resource Management 2-9
Guidance 2-12

2.3 Municipal Requirements
Sewer Use Bylaw 2-21
Guidance 2-22

SECTION 3. EVALUATING YOUR BUSINESS 3-1
3.1 Lithography-Prepress: Checklist 3-2
To Do List 3-7
Guidance 3-8

3.2 Lithography-Pressroom: Checklist 3-10
To Do List 3-17
Guidance 3-18

3.3 Screen Printing-Prepress: Checklist 3-27
To Do List 3-30
Guidance 3-31

---

* EcoLogo and the Environmental Choice Program are registered trademarks of Environment Canada.

Table Of Contents

3.4 Screen Printing- Pressroom & Postpress:
Checklist 3-33
To Do List 3-35
Guidance 3-36

3.5 Plant:
Checklist 3-39
To Do List 3-43
Guidance 3-44

3.6 Property:
Checklist 3-48
To Do List 3-54
Guidance 3-55

SECTION 4. SYSTEMS FOR POLLUTION PREVENTION AND COMPLIANCE 4-1
4.1 Small-Sized Business: A Checklist-Based System 4-4
4.2 Medium-Sized Business: A Policy-Based System 4-5
4.3 Large-Sized Business: An ISO 14001-Based System 4-19

SECTION 5. REFERENCES 5-1

SECTION 6. APPENDICES

APPENDIX 1 Telephone Numbers for Government and other Resources
APPENDIX 2 Tank Inventory
APPENDIX 3 Waste Audit Inventory
APPENDIX 4 Use of Neighbouring Properties
APPENDIX 5 Training Records
APPENDIX 6 Standard Environmental Checklist
APPENDIX 7 Using MSDS for Solvent and Chemical Selection
APPENDIX 8 Chemical Purchasing Authorization Form
APPENDIX 9 Common Chemical Product Management
APPENDIX 10 Flowsheet Showing Inputs and Outputs from a Typical Lithographic Printing Operation
APPENDIX 11 EcoLogo Information
APPENDIX 12 Emergency Contacts
APPENDIX 13 Spill Response Procedures

Table Of Contents

APPENDIX 14 Workplace Hazardous Materials Information System

APPENDIX 15 Record of Housekeeping

APPENDIX 16 Containment Tank Criteria

APPENDIX 17 Monthly Inspection Checksheet

APPENDIX 18 Six Month Inspection Checksheet

APPENDIX 19 List of Policies and People Responsible

APPENDIX 20 National Pollutant Release Inventory (NPRI)

APPENDIX 21 Accelerated Reduction/Elimination of Toxics Program (ARET)

APPENDIX 22 Sewer Discharge Bylaw

APPENDIX 23 VOC Emission Performance Targets as a Function of Printing Presstype

SECTION 7. RESOURCES

Benefits

Section 1: Benefits of Pollution Prevention

The Printing Industry

The printing industry is the silent giant of Canadian and Atlantic industry. We touch every person seven times before he or she gets to work in the morning, from the newspaper to the cereal box.

In Canada we:

- **are the fourth largest manufacturing sector**
- **consist of 3,200 businesses**
- **employ 75,000 people**
- **will produce $9.0 billion in annual revenue in 1999**

Our industry is made up of many small businesses. In fact, fewer than three percent of the firms have more than 100 employees.

Printing is a capital intensive industry. In Canada, each $1.50 in revenue requires a capital investment of $1.00. On average, each worker represents $107,000 in gross revenues and requires about $71,000 in capital equipment.

Typically, a printing company is privately-owned and managed by that owner. The assets of the company are the retirement fund for the owner and his family. These assets *can be put at risk* by how the business manages environmental issues.

In Atlantic Canada we:

- **comprise over 260 printing companies of which 226 employ less than 10 people**
- **employ over 3,600 people**
- **will produce $150 million in annual revenue in 1999**

How Your Business Affects the Environment

Printers have been faced with increasing regulatory pressures for many years. The industry, in general, has been targeted for its environmental record because of the nature of the printing process. From pre-press through to finishing stages, there is heavy use of chemicals, resulting in the generation of waste dangerous goods, effluent and emission issues.

Many of the printing chemicals and inks contain solvents that are volatile organic compounds (VOCs). When VOCs combine with nitrous oxides (NOx) in sunlight, they form ground-level ozone, more commonly known as smog. This smog may be formed in your neighbourhood or hundreds of kilometres away. Reducing the VOCs used in your printing business reduces smog. The industry has also had to deal with problems of large amounts of paper and packaging waste.

Most industries also contribute to increased greenhouse gas concentrations through their energy and transportation uses. Many scientists now believe that an increased concentration of greenhouse gases in our atmosphere will change our climate and weather patterns much faster than any natural change. If these climate changes occur, they could result in flooding of Canada's coastal areas, increased temperatures, prolonged periods of drought, water shortages and greater incidence of severe weather patterns.

How the Environment Affects Your Business

What impact does the environment have on your business? Banks now insist on environmental property assessments before accepting that property as collateral. They require a business to complete an environmental checklist before loaning money for equipment purchases or providing lines of credit. Banks have come to know through painful experience that environmental damage can reduce the value of a property to below zero. You can't even give the property away until the contamination from a spill has been removed or remediated.

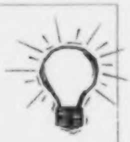
Governments have a responsibility to ensure that what we do today, won't prevent future generations from enjoying the same rights and privileges that we enjoy. This responsibility includes passing and enforcing laws to discourage pollution by punishing those who create it.

Willful destruction of the environment for profit has become socially unacceptable and has resulted in fines and jail terms. An individual who commits an offence pursuant to the Environment Act may be liable to a fine of up to one million dollars or to imprisonment for a period of up to two years. Polluters must also pay for the damages caused by their actions.

Unless an environmental incident such as a spill was caused by an act of God, a company will probably be charged and fined for any damage it causes. ***An incident indicates a breakdown in a company's internal systems and procedures***. The difference between being charged and convicted or not being charged at all is a matter of "due diligence."

Due Diligence

Due diligence means being able to prove that *all reasonable care was taken* to prevent the environmental incident. The key words are *prove* and *reasonable*.



An environmental management system (EMS) is a framework for organizing and planning the activities required to achieve the environmental goals and objectives of the company. An EMS does three things:

- prevents environmental problems,
- shows due diligence if an environmental problem occurs, and
- keeps an environmental problem from getting worse.

This pollution prevention guide can help you along the road to taking all reasonable care. Use this tool to create an environmental management system (EMS) for your company — a system that can help prevent environmental incidents from occurring and a system that creates a document trail. An EMS improves your chances of proving due diligence if an accident does occur and, therefore, reduces both your company's risk and your risk of being personally charged with an offense. Our hope is that printers implement an EMS before an *incident* occurs.

Section 4 of this guide includes three options for adopting an EMS. Choose the option that best fits your needs and is right for the size of your company.

Profit = selling price - cost of goods manufactured

Pollution Prevention and Profitability

Printers know that selling price is dictated by the marketplace. For example, the selling price of a printed advertising flyer is influenced not only by the cost of paper, which may be up to 70 percent of the selling price, but also by the cost of other mediums such as radio and television advertising.

Most customers ask for estimates before having their work done and select a printer based on competitive pricing. Efficiency in the print shop dictates whether there is a profit after a job has been run and delivered.

What may *not* be generally known, however, is the range of gross profit margins in the printing industry. A recent survey showed that while top printers made upwards of 13 percent on gross sales in Canada, the average was only 3 percent. With all printers having access to the same equipment and materials, the difference in profit margins must come from a difference in operating costs — how the business is managed.

In Appendix 10, you'll find a flow sheet for a typical lithographic printing job, showing the materials and inputs needed to take an image to final product. While there are only 21 materials inputs, there are 26 outputs or waste streams. The amount of waste produced, the cost of managing that waste and the money spent on the utility bill can all be controlled.

This is the role of pollution prevention — to anticipate and prevent the creation of waste at the source. Waste can be energy, paper, chemicals, labour or equipment that fails before its time. By controlling processes, management practices, materials and energy, you *can* prevent pollution, and at the same time, reduce the cost of goods manufactured. **This puts more money in your pocket.**

Pollution prevention means anticipating and stopping the creation of pollutants *at source*. This includes controlling processes, materials and energy along with using best management practices in your day-to-day business operations.

Specifically, this is what pollution prevention can do for you:

1. **Less waste means more profits** When your process creates emissions — whether they're liquid, solid or airborne — they increase overhead costs that must be paid for, but cannot be charged to the customer.
2. **Environmental efforts are marketable** Customers look for *green* printers that operate their businesses in a way that doesn't damage the environment. Customers can't afford to be involved with a business that's recognized as a polluter.
3. **Pollution prevention reduces risk** If you cause an environmental problem, expect to be dealt with harshly unless you can prove due diligence. The environment is an important issue.
4. **Consistent process = consistent quality = consistent profits** An environmental management system (EMS) includes preventive maintenance and quality control measures. An EMS encourages consistent procedures and reduces losses from process variations and personnel changes.

Your Pollution Prevention Tools

The *Pollution Prevention Guide for Printers in Atlantic Canada* is based on the *Manitoba Pollution Prevention Guide for Printers* (1998) and Nova Scotia's *Environmental Management Manual and Resource Guide* (1995). Both of these guides were published to assist printers in pollution prevention and to demonstrate collective environmental responsibility for the printing industry as a whole.

We have designed this pollution prevention guide with the following points in mind:

- You want to run your business and do your job responsibly.
- You are already busy and don't have time to research and develop your own tools for an environmental management system.
- You will be interrupted by the day-to-day operation of your business, and any program or project must be designed so you can easily pick it up where you left off.
- An environmental management system must live in a business world and be compatible with formal standards such as ISO 14001.
- Your employees will help if they are part of the planning, implementation, results and the success stories.
- You need a revenue based marketing reason to assign time and resources to pollution prevention.
- If you seek financing for new equipment, the bank may require you to complete their standard environmental checklist (see sample in Appendix 6). Using this guide will make that job simple.
- If you sell your business the bank will insist you complete their standard environmental checklist before they lend funds to a purchaser. Use this guide instead of starting from scratch.

The pollution prevention guide includes the following:

Section 1: Benefits of Pollution Prevention
An introduction outlining why pollution prevention is good for your business and an overview of using this pollution prevention guide

Section 2: Best Practices and Complying with Regulations
Step-by-step checklists and guidance information to help you identify the environmental regulations that affect your business and their compliance requirements

Section 3: Evaluating your Business
Step-by-step checklists and guidance information to help you look critically at your prepress operations, pressroom, overall plant and property

Section 4: Systems for Pollution Prevention and Compliance
Three options for developing an EMS based on the size of the printing operation

Section 5: References

Section 6: Appendices
Forms for recording your environmental performance

Section 7: Resources

EcoLogo and the Environmental Choice Program

Using this pollution prevention guide is a direct and inexpensive route to the Environmental Choice Program, EcoLogo certification. This nationally recognized standard can lead to more sales and open up new markets.

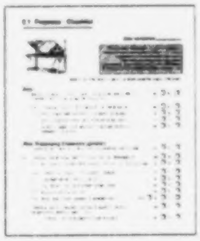
Lithographic and Screen printers meeting specific requirements can apply to the Environmental Choice Program for authorization to use the EcoLogo. The EcoLogo is a symbol identifying a product or service that reduces the burden on the environment. When your customers see this symbol on your letterhead and the products you print for them, they'll know that your company has gone beyond compliance. The EcoLogo says that you're an environmental leader!

Many of the EcoLogo requirements have been incorporated into this pollution prevention guide so that when you have successfully completed it, you should be ready to apply for EcoLogo certification. In Appendix 11, we've included a summary of EcoLogo products and services, along with a sample of the certificate you'll receive if your application is accepted.

Using the Checklists

The checklists in Section 2 and Section 3 are divided into specific and manageable topics:

- best practices and complying with environmental regulations (Sections 2.1, 2.2, and 2.3)
- evaluating the prepress area - lithography (Section 3.1)
- evaluating the pressroom - lithography (Section 3.2)
- evaluating the prepress area - screen printing (Section 3.3)
- evaluating the pressroom and postpress - screen printing (Section 3.4)
- evaluating the plant (Section 3.5)
- evaluating the property (Section 3.6)



If it's appropriate, give specific Sections to individual department supervisors to complete. *But remember: As the owner or manager you retain the responsibility for the environmental performance of your company.*

Legal Requirements

The starting point for every environmental management system (EMS) is compliance with all applicable local, provincial and federal laws.

Marking Your Answers

Read each item on the checklists and mark the answer most appropriate for your business. A *Yes* answer generally means you're doing the right thing. A *No* answer means you need to investigate further to make sure you're not out of compliance with a legal requirement or you're not overlooking the best pollution prevention opportunity. An N/A answer means that the item doesn't apply to your facility. In some cases, we ask you to check whether you're following a certain procedure, and if not, provide a reason.

Sometimes the checklists will present you with several options for one P2 activity. Where it's possible, these options are listed *in order from the best P2 method to the least.* In some cases, two options might be equal. The order is based on the pollution prevention hierarchy, with **avoidance** as the most preferred option then **reduce** and **treat** as the last resort.

When you're reviewing your business, use the blank "To Do" lists at the end of each Section to make a note of items you don't want to forget.

Getting More Information

What if you don't understand a statement on one of the checklists? Well, you don't have to go far for help. At the end of each subsection, there's detailed guidance information for each item on the checklist.

For example, if you have a question about statement 6 in Section 3.1 (Evaluating the prepress area), turn to the guidance at the end of Section 3.1 and look up item number 6.

If you have multiple facilities, use a different set of checklists for each facility.

Best Practices

Section 2: Best Practices and Complying With Regulations

Introduction

Environmental regulations affect every printer in the industry. ***Complying with those regulations is the minimum a printer must do.*** Of course, you have several options for how your business will comply. And that's where this pollution prevention guide comes in. It tells you how to comply by not creating pollution in the first place. This is much easier and more cost-effective than treating the pollution after it has been generated. This Section of the guide provides information about federal, provincial and municipal regulations. There's a checklist for each level of government and guidance explaining each regulation and its requirements.

Table of Contents - Section 2

2.1 Federal Requirements

National Pollutant Release Inventory (NPRI) 2-2
ARET 2-2
Polychlorinated Biphenyls (PCBs) 2-2
Asbestos 2-2
Ozone Depleting Substances (ODSs) 2-2
VOCs 2-2
Guidance 2-3

2.2 Provincial Requirements

Spills 2-6
Controlled Products 2-7
Off-Site Hazardous Waste Management 2-8
Air Emissions Management ... 2-9
Solid Waste Resource Management 2-9
Guidance 2-12

2.3 Municipal Requirements

Sewer Use Bylaw 2-21
Guidance 2-22

Notes

2.1 Federal Regulations and Code of Practices - Checklist

Date completed ________

National Pollutant Release Inventory (NPRI)

1. We use chemicals that are on the NPRI list. (See Appendix 20). (If you answer "No," skip to item 2.) Yes ☐ No ☐
   - i. We have a copy of the *Guide for Reporting to the National Pollutant Release Inventory* in the environmental file. Yes ☐ No ☐
   - ii. We have implemented a plan to reduce or eliminate the use of all NPRI chemicals at our facility. Yes ☐ No ☐
   - iii. We have determined that we do not qualify for reporting under the NPRI. Yes ☐ No ☐

> The National Pollutant Release Inventory (NPRI) is a publicly-accessible database listing 176 chemicals that are discharged into the environment annually, as reported by companies that meet designated criteria. Most printers who are required to report under NPRI generally do so because they use at least one barrel of isopropyl alcohol per week.

Accelerated Reduction/Elimination of Toxics Program (ARET)

2. We use chemicals that are on the ARET list (See Appendix 21). (If you answer "No," skip to item 3.) Yes ☐ No ☐
   - i. We have a copy of ARET in the environmental file. Yes ☐ No ☐
   - ii. We have implemented a plan to reduce or eliminate the use of all ARET chemicals at our facility. Yes ☐ No ☐

Managing Polychlorinated Biphenyls (PCBs)

3. Our building is free of transformers, light ballasts or capacitors that may contain PCBs. (If you answer "Yes," skip to item 4.) Yes ☐ No ☐
   - We have a plan in place to phase out the use of PCBs in our operation by the year ______. Yes ☐ No ☐
4. We do not store PCBs at our facility. (If you answer "Yes," skip to item 5.) Yes ☐ No ☐
   - PCBs on-site are registered with Environment Canada and all documentation is in the environmental file. Yes ☐ No ☐

> Polychlorinated biphenyls (PCBs), which were one time prized for their insulation properties, are now considered to be cancer-causing agents. As such, they are closely regulated. If you store PCBs on your site, you must comply with several requirements including registration, emergency control plans and recordkeeping.

Asbestos

5. Our facility is free from asbestos. Yes ☐ No ☐

Ozone Depleting Substances (ODSs)

6. Ozone depleting substances (ODS) are used in the building. Yes ☐ No ☐
   - We have implemented a plan to phase out the use of ODSs in our operation and replace them with acceptable alternatives by the year________. Yes ☐ No ☐

Environmental Code of Practice for Reduction of Volatile Organic Compounds from the Commercial/Industrial Printing Industry - Draft

7. Our facility complies with the Code. Yes ☐ No ☐

2.1 Federal Regulations and Code of Practices - Guidance

Checklist Item Number **Guidance Information**

1. **National Pollution Release Inventory (NPRI)**
The NPRI is a list of 176 toxic chemicals and chemical compounds (See Appendix 20). In general, Canadian companies who produce, use or release these chemicals and who meet the following NPRI reporting criteria are legally required to submit a report to Environment Canada by June 1st of each year.

NPRI Reporting Criteria:

- Your facility has the equivalent of 10 full-time employees (20,000 person hours).
- Your facility manufacturers, processes or otherwise uses 10 metric tonnes of NPRI substances per year.
- Your facility uses the NPRI substances at a concentration equal to or greater than 1 percent.

Typically, isopropyl alcohol is the only listed chemical that a lithographic printer might use in reportable quantities. The threshold of one 205 litre barrel per week would normally only put the largest of printers into the NPRI reporting system.

To obtain a copy of the *Guide for Reporting to the National Pollutant Release Inventory*, contact Environment Canada:

- Mr. Chris Roberts, phone: (902) 426-4482, fax: (902) 426-8373
  e-mail: chris.roberts@ec.gc.ca
- Internet <http://www2.ec.gc.ca/pdb/npri>

The CAS is the Chemical Abstract Service number. This number is used on material safety data sheets (MSDSs) to identify specific chemical substances. MSDSs are available from your chemical supplier.

2. **ARET (Accelerated Reduction/Elimination of Toxics Program)**
The ARET program is a voluntary pollution prevention initiative. The aim of ARET is to decrease the adverse effects of toxic substances on human health and the environment by accelerating the reduction/elimination of selected toxic substance emissions. This goal will be achieved by challenging industrial and government organizations to reduce or eliminate emissions of 117 toxic substances. See Appendix 21. Internet: http://www.cbsc.org/ontario/bis/2046.html.

The ARET and NPRI lists of chemicals can be used by all printers to identify pollution prevention opportunities for replacing these chemicals with acceptable substitutions that are not on the lists.

2.1 Federal Regulations and Code of Practices - Guidance

Checklist Item Number **Guidance Information**

3. **Managing Polychlorinated Biphenyls (PCBs)**
All PCB storage facilities are regulated under the provisions of the Canadian Environmental Protection Act and must be registered with Environment Canada. To obtain information on the safe storage of PCBs at your facility, please see Appendix 12 for contact names.

PCB storage must also be registered with the provincial agency. Contact Department of Environment for a PCB Storage Site registration form and a hazardous waste registration form (See Appendix 1).

5. **Asbestos**
Asbestos is classified as a confirmed human carcinogen. It was used in the past for steam pipe insulation, in fire proof ceiling tiles and in building board for fire proof partitions. Most Yellow Pages have a Section entitled "Asbestos Abatement and Removal." Contact a professional removal service if you suspect you have asbestos.

For information on asbestos, download a copy of *Guidelines for Working with Asbestos* from the Internet at <http://www.gov.mb.ca/labour/safety/bulletins/asbestos/asbestos.html>.

6. **Ozone Depleting Substances (ODSs)**
Ozone depleting substances (ODSs) are those chemicals that have been linked to the destruction of the ozone layer. These chemicals have chlorine atoms that are released into the atmosphere. Each chlorine atom can destroy 100,000 ozone molecules and lasts for 100 years in the atmosphere. The intention is to eliminate the use of ODSs and replace them with acceptable alternatives.

The ODSs that you are most likely to have on your site are refrigerants (CFCs) used in chilling and refrigeration systems, and Halon fire suppression systems. These ODSs include the following: Freon 12, Freon 113, Halon 1211, and Halon 1301. Check the names displayed on chilling appliances and systems in your facility to ensure none use these ODSs.

For more information, contact Environment Canada, Mr. Gerry Ternan, phone: (902) 426-1631 or Mr. Keith Keddy, phone: (902) 426-9034, fax: (902) 426-8373.

7. **Environmental Code of Practice for Reduction of Volatile Organic Compounds from the Commercial/Industrial Printing Industry (Draft)**

As part of the Canadian Council of Ministers of the Environment (CCME) initiative to reduce the formation of ground level ozone, environmental code of practice was developed to reduce volatile organic compound (VOC) emissions from the

2.1 Federal Regulations and Code of Practices - Guidance

Checklist Item Number	Guidance Information

commercial and industrial printing industry. Of particular importance to printers in Atlantic Canada is the initiative V308. Initiative V308 recommended the development of an environmental code of practice, including new source performance standards for commercial/industrial printing facilities.

The Code was drafted by Environment Canada with input from representatives of industry, environmental groups and provincial agencies. It contains proposed national VOC emission reduction targets for nine types of printing processes to be met no later than 2005 (See Appendix 23 *VOC Emission Performance Targets as a Function of Printing Type*). Authorities having jurisdiction (provinces/territories, regional governments) will establish time lines for meeting the targets with the industry. The Code is currently in draft form, and is expected to be finalized in 1999. Once the Code is finalized, it will be submitted to CCME for approval.

Who is covered by Code?
All commercial/industrial printers except:
- those using <1000 kg of VOC/year
- those involving manual or non-mechanical screen printing operations only.

Baseline Calculations:
- Determine VOC content of raw materials (see MSDS or contact Chemical Manufacturer)
- Establish baseline uncontrolled VOC amount for facility (highest amount in last three years)
- Adjust baseline if action taken in past five years has reduced VOC emissions*
- Facility is exempted where uncontrolled VOC amount is less than emission target.

VOC Emission Performance Targets - Limit emission to the greater of:
- No more than 25 tonnes/year
- Allowable fraction of baseline uncontrolled VOC amount for the facility

Targets should be achieved by:
- immediately upon startup for facilities with new presses only
- within 5 years after publication of Code and no later than 2005 for facilities with existing presses (to be negotiated with local authority)

Demonstrating Conformance - Done annually by:
- Conventional testing and monitoring using accepted sampling and test methods and protocols, or
- Calculation using emission factors for various prevention and control options

2.2 Provincial Regulations and Best Practices - Checklist

Many of the items identified in Section 2.2 Provincial Regulations and Best Practices are directly regulated by provincial departments of Environment and Labour. A number of best practices have also been included here. While these best practices are not directly regulated, implementing them will help your business comply with regulations and demonstrate due diligence.

Spills to the Outside Environment

NS:	Emergency Spill Regulations
NB:	Clean Environment Act
NF:	Contact your provincial representative (Appendix 1)
PEI:	Environmental Protection Act

1 We have a copy of the provincial Emergency Spill Regulations or other regulations pertaining to spill in the environment file. Yes ☐ No ☐

Best Practices for Spill Prevention and Management

2. If there are storm sewers outside the loading docks of our building, they are covered with grates. N/A ☐ Yes ☐ No ☐

3. We have checked all the floor drains in our building to determine whether they're connected to the sanitary sewer OR the storm sewer. N/A ☐ Yes ☐ No ☐

   i. We have checked for cross connections. N/A ☐ Yes ☐ No ☐

   ii. All drains connected to the storm sewer have been permanently sealed. N/A ☐ Yes ☐ No ☐

4. We have a written emergency spill response plan posted in our facility so that it's available on all shifts. Yes ☐ No ☐

The written emergency spill response plan includes all the following checked items:

Item	*Check if in the plan*	*If not checked, explain why not*
Spill clean-up procedure	☐	________________
Covers for floor drains	☐	________________
Covers for storm sewer drains outside the loading docks	☐	________________
Spill reporting procedure (Appendix 3)	☐	________________
Spill kit(s) and other supplies	☐	________________
Floor plan	☐	________________
Emergency phone list (Appendix 12)	☐	________________

2.2 Provincial Regulations and Best Practices - Checklist

5. We have spill kits available at the chemical storage rooms or racks. Yes ☐ No ☐
   i. The location of the spill kits is shown on the floor plan. Yes ☐ No ☐
   ii. The locations of all spill kits are clearly marked with signs. Yes ☐ No ☐
   iii. The spill kits are formally and routinely inspected. Yes ☐ No ☐
   iv. The inspection reports are stored in the environmental file. Yes ☐ No ☐

6. There is a berm or dike around all areas where significant amounts of chemicals are stored. Yes ☐ No ☐

7. Employees have been trained on all aspects of emergency spill response including spill prevention, response, clean-up and reporting. Yes ☐ No ☐

   All training is documented and the records are in the environmental file. (A sample Training Record is included in Appendix 5.) Yes ☐ No ☐

Handling Controlled Products

NS: Workplace Hazardous Materials Information System (WHMIS) Regulations
NB: Occupational Health and Safety Act
NF: Occupational Health and Safety Regulations
PEI: Occupational Health and Safety Act

8. We have a copy of the Provincial Workplace Hazardous Materials Information System regulation (WHMIS) in the environmental file. Yes ☐ No ☐

9. We are in compliance with WHMIS including the following checked items.

Item	*Check if done*	*If not checked, explain why not*
We have a current material safety data sheet (MSDS) for every controlled product that requires one.	☐	________________
MSDSs are available on all shifts.	☐	________________
Worker education and training are current.	☐	________________
All containers of controlled products including pipes are properly labeled.	☐	________________
We have a list of all hazardous materials present in our building.	☐	________________

2.2 Provincial Regulations and Best Practices - Checklist

Off-Site Waste Dangerous Goods Management

10. In the environmental file, we have a copy of the Federal Transportation of Dangerous Goods Act, Generator Registration and Carrier Licensing regulation, Manifest regulation and Classification Criteria for Products, Substances and Organisms regulation. Yes ☐ No ☐

11. If we ship hazardous waste off-site we have a waste generator registration number from Department of Environment. N/A ☐ Yes ☐ No ☐

    A copy of the registration is stored in the environmental file. Yes ☐ No ☐

12. We contract with a hauler to transport our waste dangerous goods off-site. Yes ☐ No ☐
    - i. A copy of the transporter's provincial registration is stored in the environmental file. Yes ☐ No ☐
    - ii. We have verified our transporter's insurance status and record of infractions. Yes ☐ No ☐

13. We contract with a receiver to treat/dispose of our waste dangerous goods. Yes ☐ No ☐
    - i. A copy of the receiver's provincial registration is stored in the environmental file. Yes ☐ No ☐
    - ii. We have verified our receiver's insurance status and record of infractions. Yes ☐ No ☐

14. We use a manifest for all shipments of waste dangerous goods that leave our site. N/A ☐ Yes ☐ No ☐
    - i. Copies of the manifest are sent to your local Department of the Environment Regional Office as indicated on the manifest form. Yes ☐ No ☐
    - ii. We retain a copy of the manifest form. Yes ☐ No ☐

15. We store all waste dangerous goods in appropriate containers. Yes ☐ No ☐
    - i. All waste storage drums and tanks are labeled while they are in the building. Yes ☐ No ☐
    - ii. All liquid wastes are kept separate, resulting in lower disposal costs. Yes ☐ No ☐
    - iii. Waste storage areas are protected by berms or dikes so that spills from leaks, ruptures or overfilling will be contained. Yes ☐ No ☐
    - iv. Waste storage tanks and drums are protected from collision. Yes ☐ No ☐
    - v. All container bungs, caps and lids are secure. Yes ☐ No ☐
    - vi. We have a procedure for employees to transport liquid wastes to the waste tanks and drums easily without causing spillage. Yes ☐ No ☐

2.2 Provincial Regulations and Best Practices - Checklist

vii. We have a procedure for employees to bulk the waste liquid in tanks or drums easily without causing spillage or build up of static electricity. Yes ☐ No ☐

viii. We have storage for solid industrial wastes such as contaminated absorbents and booms. Yes ☐ No ☐

ix. Flammable/combustible liquids are stored in grounded containers. Yes ☐ No ☐

16. Employees are trained in the following areas:

Handling liquid wastes Yes ☐ No ☐

Storing liquid wastes Yes ☐ No ☐

Preparing waste chemicals for transport Yes ☐ No ☐

Preparing and signing manifests Yes ☐ No ☐

i. All training is documented and the records are in the environmental file. Yes ☐ No ☐

ii. Employees in the shipping and receiving areas carry wallet TDG cards. Yes ☐ No ☐

Air Emissions Management

The protection and preservation of ambient air quality in each province falls under the jurisdiction of the respective provinces' Department of Environment.

17. We have a preventive maintenance program for all pollution control equipment that, at a minimum, includes the manufacturers' recommendations. N/A ☐ Yes ☐ No ☐

18. Our site plan shows all the stacks on the roof with details of what is connected to them . N/A ☐ Yes ☐ No ☐

19. We have never received a complaint about odours or noise from our facility. Yes ☐ No ☐

20. We have notified the Provincial Department of Environment about any changesto either the facility or the equipment that could result in changes to air quality outside of our facility. Yes ☐ No ☐

3Rs

Solid Waste Resource Management

NS:	Solid Waste Resource Management Regulations
NB:	Clean Environment Act
NF:	Waste Material Disposal Act, The Packaging Material Act, The Storage of PCB Waste Regulations, Used Oil Control Regulations (proposed)
PEI:	Waste Resource Management Regulations (proposed), Used Oil Handling Regulations

2.2 Provincial Regulations and Best Practices - Checklist

*****All the items shown in bold text on the following two pages are no longer accepted for disposal in Nova Scotia landfills. Discuss condition of the material with your local recycler prior to sending it for recycling.**

21. We have completed a waste audit by examining all the waste produced in our business and what happens to it. (See Appendix 3). Yes ☐ No ☐

i. Based on the waste audit, we have developed a written waste management and source reduction work plan that includes the following elements:

Element	*Check if included*	*If not checked, explain why not*
Requirement for ensuring all materials included in provincial landfill bans are recycled or composted in accordance with provincial regulations.	☐	______________________
Specific activities for waste reduction at source	☐	______________________
Targets (amount to be reduced and when)	☐	______________________
Responsibility assigned for each activity	☐	______________________
Requirement for a follow-up audit	☐	______________________
Requirement to update the work plan	☐	______________________
Specific activities to involve employees	☐	______________________

ii. The waste management work plan includes recycling the following items:

Item	*Check if recycled*	*If not checked, explain why not*
Glass Containers	☐	______________________
Beverage Containers	☐	______________________
High density polyethylene (HDPE) jugs, pails, crates, totes or drums	☐	______________________
Roll wrappers	☐	______________________
LDPE	☐	______________________
Stretch wrap film	☐	______________________
Solvent	☐	______________________
Steel (and steel strapping)	☐	______________________
Used oil	☐	______________________

2.2 Provincial Regulations and Best Practices - Checklist

The following items must be recycled to qualify for EcoLogo certification.

Item	*Check if recycled*	*If not checked, explain why not*
Aluminum plates	☐	
Corrugated Cardboard	☐	
Film	☐	
Fine paper		
Coloured	☐	
Printed	☐	
White/unprinted	☐	
Office waste paper	☐	
Newsprint		
Coloured	☐	
Printed	☐	
White/unprinted	☐	
Item	*Check if recycled*	*If not checked, explain why not*
Roll end caps/plugs	☐	
Web roll cores	☐	
Wood and wood pallets	☐	
Segregation of organic waste materials for composting	☐	

See page 2-20 for additional information on dealing with materials which are banned from landfills in Nova Scotia.

2.2 Provincial Regulations and Best Practices - Guidance

Checklist Item Number | **Guidance Information**

1. **Spills**
Spills of waste dangerous goods (or other contaminants) must be immediately reported to the Department of Environment and to your local police or fire department. The 24-hour environment emergency reporting number is 1-800-565-1633. As an example the following table lists the types of spills that must be reported to the Department in Nova Scotia. A rule of thumb is, when in doubt, report the spill.

Spill Report Requirements (Nova Scotia - April 11, 1995)

Column 1	Column 2	Column 3	Column 4
Item No.	**TDGA Class**	**Description of Contaminant**	**Amount Spilled**
1.	1	Explosives	any amount
2.	2.1	Compressed gas (flammable)	100 L
3.	2.2	Compressed gas (non-corrosive, non-flammable)	100 L
4.	2.3	Compressed gas (toxic)	any amount
5.	2.4	Compressed gas (corrosive)	any amount
6.	3	Flammable liquids	100 L
7.	4.1	Flammable solids	25 kg
8.	4.2	Spontaneously combustible solids	25 kg
9.	4.3	Water reactant solids	25 kg
10.	5.1	Oxidizing substances	50 L or 50 kg
11.	5.2	Organic peroxides	1 L or 1 kg
12.	6.1	Poisonous substances	5 L or 5 kg
13.	6.2	Infectious substances	any amount
14.	7	Radioactive substances	any amount
15.	8	Corrosive substances	5 L or 5 kg
16.	9.1 (in part)	Miscellaneous products or substances, excluding PCB mixtures	50 L or 50 kg
17.	9.1 (in part)	PCB mixtures of 50 or more parts per million	0.5 L or 0.5 kg
18.	9.2	Environmentally hazardous substances	1 L or 1 kg
19.	9.3	Dangerous wastes	5 L or 5 kg
20.	none	Asbestos waste as defined in the Asbestos Waste Management Regulations	50 kg
21.	none	Used oil as defined in the Used Oil Regulations	100 L
22.	none	Contaminated used oil as defined in the Used Oil Regulations	5 L
23.	none	A pesticide in concentrated form	5 L or 5 kg
24.	none	A pesticide [in] diluted form	70 L
25.	none	Unauthorized sewage discharge into fresh water or sensitive marine water	100 L
26.	none	Ozone depleting substances as defined in the Ozone Layer Protection Regulations	25 kg

2.2 Provincial Regulations and Best Practices - Guidance

Checklist Item Number	Guidance Information
2.	**Storm Sewer Drains** In the parking lot there are two types of accidents that you must prepare for: spills from chemicals as they're being unloaded on your dock and leaks from trucks, either from leaking loads containing chemicals or from truck fuel tanks. Discharges to storm sewers lead directly to surface waters such as rivers, lakes and streams. Only discharges to sanitary sewers are treated at the sewage treatment plant before they're released to the environment. If there is a storm sewer drain be sure that you have a rubber mat available at the shipping door to cover it. These mats are available from safety supply companies and are inexpensive. A standard spill kit that contains absorbent material and booms should also be in your shipping department. (Spill kits are discussed in item 4.) If your loading dock area is not paved, a spill clean-up will involve contaminated soil. Consider paving at least the area that a parked truck or tractor trailer covers when unloading.
3.	**Floor Drains** A spill inside your building is a mess. A spill outside your building is an environmental accident that may have to be reported depending on the material and the quantity spilled. In light of this, you may find it appropriate to seal all of your floor drains. If not, you should have covers available at each one so that a spilled chemical can be stopped from entering the drain.
4.-7.	**Emergency Spill Response Planning** Part of the environmental management system is to establish an emergency response plan, and to make it available to personnel on all shifts. Appropriate employees must be aware of it and trained to use it. The emergency response plan should contain several elements: • Spill clean-up procedure — This is the set of steps you take to clean-up a spill. In Appendix 13, you will find a spill response procedure. We recommend that you photocopy this page, laminate it, and post it in any areas where spills might occur. • Spill kit — A spill kit, that can be used to contain and clean-up a spill, should be located near any area where significant quantities of chemical are stored or used A minimum spill kit will contain: • chemical proof gloves - 1 pair • disposable apron - 1 unit • disposable shoe covers - 1 pair

2.2 Provincial Regulations and Best Practices - Guidance

Checklist Item Number **Guidance Information**

- absorbent materials which may include booms, pads and absorbent materials for picking-up the spill
- corrosion-proof (plastic) pail suitable for storing and shipping the waste - 1 unit

Spill kits are often robbed when a broom, shovel, pair of gloves or paper coverall is required in the plant. It's important that this pilfering be minimized, and that the spill kit be inspected regularly. Nothing is more disturbing than watching a spill go unchecked because the spill kit is empty. During their regular inspections, the joint health and safety committee should check that spill kits are complete. The inspection checklists should be stored in the environmental file or with the joint health and safety committee notes.

- Emergency contact list — Each person on this list should know his/her specific responsibilities if an environmental incident occurs (use the form in Appendix 1 to record the names and telephone numbers). This contact list should also include the 24 hour environmental emergency phone number: 1-800-565-1633.

8. Workplace Hazardous Materials Information System Regulation (WHMIS)

The following is based on material from the OPIA publication, Management Guide to a Safe Environment. This publication is available from OPIA at (905) 564-9411.

The Workplace Hazardous Materials Information System (WHMIS) regulation is designed to protect workers by providing them with vital information about the hazards of materials used in their workplace. The underlying philosophy is that workers have a right to know about the hazards in their workplace so they can take the necessary precautions to protect themselves. These hazards include biological as well as chemical hazards. Because our concern is with only the printing industry; we're going to focus on chemical hazards.

WHMIS has three elements:
1. material safety data sheets,
2. labels, and
3. worker education and training.

Since many of the products used in the printing industry are classified as controlled products, the WHMIS legislation applies to these workplaces. This means MSDSs must be available for those products that require them. All controlled products must be labeled, and employees must be trained in WHMIS.

For a more detailed discussion of WHMIS, see Appendix 14.

2.2 Provincial Regulations and Best Practices - Guidance

Checklist Item Number **Guidance Information**

9. **Material Safety Data Sheets (MSDSs)**

Where Required

MSDSs must be available to any worker who works with or in proximity to controlled products on all shifts. They should not be stored in a supervisor's office that is locked after normal business hours.

Inspectors for the Department of Labour, Occupational Health and Safety Division, monitor compliance with WHMIS requirements. Any employee who has exposure to chemicals can be asked if they have been properly trained in WHMIS. If you wish issue wallet-sized WHMIS cards to all trained employees. Train all affected employees *before* they work with hazardous materials. Review WHMIS training annually with the joint occupational health and safety committee to decide how often to provide retraining. Store the training records in the environmental file or with the joint health and safety committee notes. (Use the form in Appendix 5 to keep track of training.)

The management is responsible for regularly inspecting containers in the workplace to make sure they're properly labeled.

Hazardous Materials Inventory

This requirement is not actually part of WHMIS but, rather, it is found in the Occupational Health and Safety Act. Preparing the hazardous materials inventory is one of the duties required in a workplace in order to comply with this Act.

12. **Waste Transporter**

Using a carrier that is not registered by the Department of Environment to carry hazardous waste is in violation of the Dangerous Goods Transportation Act.

Obtain a copy of the insurance certificate from the transporter. Call your local Department of Environment office to find out if the transporter has any record of infractions.

13. **Waste Receiver**

All hazardous waste disposal facilities must submit an application to the Department of Environment for an approval to operate a disposal facility. Their receiver registration number should be in your files ***before*** you ship waste dangerous goods to their facility.

Obtain a copy of the insurance certificate from the receiver. Call your local Department of Environment office to find out if the receiver has any record of infractions.

2.2 Provincial Regulations and Best Practices - Guidance

Checklist Item Number **Guidance Information**

15. **Liquid Waste Storage**

Waste disposal companies have staggered pricing for liquid waste disposal. If the liquid is a mixture of all of the liquid wastes from your plant, it will be classified as oily water. If it is segregated, oil from your equipment can be recycled, fixer can be recycled, spent solvent can be used for fuel blending for cement kilns, and your waste disposal cost will be significantly reduced. Your disposal contractor will be pleased to review your options and their costing with you.

Reducing Spills

We are now out of a regulatory issue and into a "best practice" issue. If you operate a larger plant your employees handle significant quantities of waste oil, fountain solution, and spent blanket wash. In most plants, these liquids are handled by the most inexperienced, lowest ranking employee on the crew. The liquid is usually transferred in open-topped ink pails with limited instruction on where to take them. (A discussion with your employees to confirm this may surprise you.)

Consider mounting a barrel on a cart, equipped with a small pump. There should be a barrel for each type of liquid waste you collect to avoid contamination that will change the waste class. If you have large waste tanks that your waste hauler pumps from, be sure they are clearly marked, again to avoid mixing wastes.

Transferring waste to the main tank should only be done by a designated employee using proper safety equipment and procedures. Keep it locked to all others.

On-Site Storage of Own Waste

You do not have to be licensed to store your own waste on the site where it was generated (i.e., until there is enough to send to recycling or disposal). Action may be taken by the Department, however, if excessive amounts of hazardous waste are being stored at the generation site or if the waste has been stored for an excessive length of time.

Flammable/Combustible Liquids

Isopropyl alcohol (IPA) and /or blanket wash are the primary flammable/combustible liquids used by printers.

16. **Employee Training**

All workers who prepare for transport, and/or receive dangerous goods must receive Transportation of Dangerous Goods training at least once every three years. As proof of the training, these workers must carry a wallet-sized certificate when they're on the job.

17. **Pollution Control Equipment**

The primary reason for pollution control equipment in a printing plant is the use of a heatset press. The oxidizer (also called an incinerator or afterburner) is usually either thermal or catalytic based.

2.2 Provincial Regulations and Best Practices - Guidance

Checklist Item Number **Guidance Information**

The catalytic units operate for approximately one-third of the energy bill of a thermal unit. They oxidize the press exhaust at 650 degrees F in the presence of a catalyst, instead of 1450 degrees F without the catalyst. However, if the catalyst is poisoned by silicon or phosphorus from the fountain solution it will no longer be effective. This is also called catalyst blinding. It results in poor destruction efficiency and high levels of odour. The strong odour is usually what prompts neighbours or employees to call the government to complain.

The maintenance manual for the catalytic unit will suggest catalyst testing as a routine inspection. This testing is approximately $1000.00 (1998 costs) and is performed by either the oxidizer manufacturer or an independent lab of their choosing. Most manufacturers recommend this be done at least yearly.

Thermal oxidizers need very little maintenance. See your operator's manual for information on setting up your preventive maintenance schedule.

18.-19. Air Emissions and Odours

NS: Air Quality Regulations
NB: Air Quality Regulations under Clean Air Act
NF: Air Pollution Control Regulations
PEI: Air Quality Regulations under Environmental Protection Act

**New Brunswick: Most facilities with large sources of air contaminants and odour are required to obtain an Approval to Operate under the Air Quality Regulations, which would limit the nature and extent of emissions from the facility. In NB, Approvals are only issued to the larger printing operations although the determination as to which source requires approval is done on a case-by-case basis. Printers in NB should contact the NBDOE to determine if they need an approval. Printers should provide detailed information about stack heights, stack diameters, exit velocity or volumetric flow rate, and contaminant concentration as well as information on the types and amounts of chemicals they use in a specified period of time.

This Section is critical if your plant is accused of releasing a contaminant. If your plant is in an industrial mall or in an area where there are many industries, expect to be targeted for any smells that seem to come from your facility. In reality, odour is a very transient annoyance and can travel up and over buildings, to reappear on the other side. Department of Environment will investigate an odour complaint. If an inspector comes to your plant show him/her the following:

2.2 Provincial Regulations and Best Practices - Guidance

Checklist Item Number **Guidance Information**

1) A site plan of the roof showing all the stacks and what they are connected to, as well as what they emit.

21. Solid Waste Resource Management

NS:	Solid Waste Resource Management Regulations
NB:	Clean Environment Act - contact your provincial representative (Appendix 1)
NF:	Waste Material Disposal Act, The Packaging Material Act, The Storage of PCB Waste Regulations, Used Oil Control Regulations (proposed)
PEI:	Waste Resource Management Regulations (proposed)

Waste Audit

A waste audit must address the following items:

- the amount, nature and composition of waste and the manner by which it gets produced, including the extent to which materials or products used or sold consists of recycled or reused material

- the management decisions and policies that related to the production of waste such as procurement policies and specifications for raw materials, supplies and equipment

Waste Management and Source Reduction Workplan

A waste management and source reduction workplan consists of an organized set of tasks developed in response to the information gathered during the waste audit. The plan must include compliance with all provincial regulations, reasonable ways to reduce, reuse and recycle waste, responsibilities for implementation, timing and expected results.

The key to success in waste management and source reduction programs is the involvement of shop floor employees. Managers cannot impact the amount of waste produced without the support of the employees. One printer started a program by posting the amount of material going to landfill each week both in tonnage and volume. A committee of volunteers was struck from employees who had an interest in the environment. They looked for ways to reduce waste in the printing plant.

One ongoing program was called "dumpster diving." Garbage containers from the machines were regularly dumped onto the floor and sorted. Paper that should have gone to the recycling program was identified and rerouted. This program helped develop machine operator awareness since the activity happened literally on the floor in front of them. This alone reduced the amount going to landfill from the plant by 50 percent.

2.2 Provincial Regulations and Best Practices - Guidance

Checklist Item Number **Guidance Information**

3Rs

Recycling

Paper & Cardboards

Large printers can rely on large fibre recyclers to pick-up their waste paper. They will be paid by the ton and by the grade of paper, depending on the market or negotiated price.

Small printers with low volumes may not get these fibre merchants to service them. Some municipalities have a curbside blue box program that the small printer can use. If there's no blue box program, the municipality usually has drop-off depots. Printers in Nova Scotia can call The Resource Recovery Fund Board Hotline at 1-800-665-LESS (5377) for additional waste management information.

High density polyethylene aluminum cans and Glass - are not wastes. They are valuable resources. Most municipal recycling facilities will accept these and other materials which have been banned from landfills. Beverage containers can also be returned to one of over 90 enviro-depots in Nova Scotia for a refund.

Roll wrappers - Many printers use the roll wrappers as slip sheets between lifts of paper on a skid. Roll wrappers also are suitable for drip catchers on catwalks and under press units. As they are plasticized to protect the paper from moisture during shipping, they are not usually directly recyclable.

Stretch wrap - Stretch wrap is banned from landfill in Nova Scotia. Some stretch wrap film suppliers have a recycling program. They also sell film in different sizes. Be sure you are using the proper size for the job you are doing. Consider reusing as well. This will decrease your cost as well as help the environment. Reusable pallet wrapping systems are also available.

Solvent - Solvents may be recovered on site or picked up by a commercial solvent recycling company. Solvent recovery equipment may be leased or purchased, however, be aware that the Department of Labour has restrictions regarding ventilation, explosion-proof ratings on the equipment and explosion-proof rooms. There are companies that are striving to meet these requirements and recyclers should be available soon.

Used oil - If you generate a small quantity of used oil, your local auto service center, or the municipality's garage may be your easiest source for an oil recycling program. If you generate significant quantities, arrange for a recycler to pick it up.

Film - There are companies that pick up spent film & recycle it for silver content.

Office waste paper - Office waste paper should be collected and added to the paper for recycling. If security or privacy is an issue then office paper should be shredded. Your office waste paper is not secure in the garbage, either.

2.2 Provincial Regulations and Best Practices - Guidance

Checklist Item Number	Guidance Information

Web roll cores - If you are a web printer, your paper supplier should be able to suggest ways to recycle your roll cores.

Wood - Used or broken skids/pallets that are a nuisance to the printer can still lead useful lives. Other industries in your town may have a need for skids for shipping. Some community service groups will repair skids for a nominal fee per skid. There are companies and service groups that are interested in recycling pallets. Sheetfed paper skids with solid tops can be a useful source of wood for farmers and hobbyists. Posting a notice on the bulletin board, talking to other industries, and talking to a local waste exchange may resolve the waste disposal problem that skids can pose.

Printer and Copier Cartridges
Many printing operations use a large number of ink and toner cartridges in their copying and printing equipment. Talk to your supplier, in many cases, company will take back used cartridges. If not, there are other companies that will recycle them.

The following sources of information are available to assist industries with the Solid Waste Management.

NS: Directory of Solid Waste Reuse, Recycling and Composting
Contacts for the Industrial, Commercial and Institutional Sector in Nova Scotia are available from the Resource Recovery Fund Board at 1-800-665-LESS (5377) or can be downloaded from the internet at http://www.clean.ns.ca/resources/ici_guide/waste.contacts.html

Nova Scotia Materials Exchange
This program assists you to contact waste recyclers. Call 1-800-665-5377, 902-420-3467 or visit the web site at http://www.clean.ns.ca/materials_exchange/wxh.html

There is no fee for service however a small donation to support the program would be gratefully accepted.

NB: Contact Atlantic Coastal Action program (ACAP) in Saint John (1-506-652-2227) OR the Municipal Services Section of NBDOE at (1-506-444-4599).

NF: Contact Trash-to-Cash program (1-888-363-8727).

PEI: Contact PEI Waste Management Commission, Mr. Shawn Ledgerwood (1-902-368-6626).

2.3 Municipal Regulations and Best Practices - Checklist

Sewer Use Bylaw

1. We obtained a copy of the sewer use bylaw from the municipality. We have reviewed it and we keep it in the environmental file. Yes ☐ No ☐

   We know the materials that are restricted or prohibited from being discharged to sewers. Yes ☐ No ☐

Some municipalities have sewer use bylaws that identify terms and conditions that must be met in order to discharge liquid waste into their systems. Typically, the bylaws restrict hazardous and toxic substances from the system and may apply surcharges to specific wastes that create additional treatment costs to the municipality.

2. Our facility has floor drains. Yes ☐ No ☐
   - i. The floor drain inside the plant is connected to sanitary sewer. Yes ☐ No ☐
   - ii. We have placed signs at sinks prohibiting disposal of hazardous waste, process chemicals and solid waste. Yes ☐ No ☐
   - iii. Equipment are pre-cleaned prior to being washed in water supplied sinks. Yes ☐ No ☐
3. We have reviewed the EcoLogo limits for sewer discharge. *(This item is optional.)* N/A ☐ Yes ☐ No ☐
4. Our facility wastewater has been tested for compliance with the sewer use bylaw *(Option: use EcoLogo certification requirements)*. N/A ☐ Yes ☐ No ☐
   - i. We perform this test routinely, every ____________. (note frequency) Yes ☐ No ☐
   - ii. The last test was performed on ______________. (date)
   - iii. We test using a 24-hour composite sample. Yes ☐ No ☐
   - iv. We use a grab sample because __________ __________. N/A ☐ Yes ☐ No ☐
   - v. Copies of all test results are stored in the environmental file. Yes ☐ No ☐
5. Spill control material (absorbent material) are readily available to prevent spills and releases from going to floor drains. Yes ☐ No ☐
6. We know and understand the municipal spill reporting requirements. Yes ☐ No ☐

2.3 Municipal Regulations and Best Practices - Guidance

Checklist Item Number	Guidance Information

1. **Municipal Sewer Use Bylaws**
This is the local municipal bylaw that details those materials that are restricted or prohibited from being discharged to sanitary, storm and combined sewers.

Information on restricted and prohibited substances found in various Sewer Discharge Bylaws in Atlantic Canada have been amalgamated and are presented in Appendix 22. The point of measurement is the property line.

We recommend that you obtain a copy of the bylaw by calling the municipal clerk's office. A listing of these telephone numbers is included in Appendix 1.

2. **Floor Drains**
The floor drains inside a shop should be connected to sanitary sewer, *not the storm sewer.* This can be confirmed by your plumber with a dye test. Older buildings are especially vulnerable to incorrect plumbing. Verify all drains in or near chemical storage areas or aisles where chemicals are transported. These drains *must not* be routed to the storm sewer.

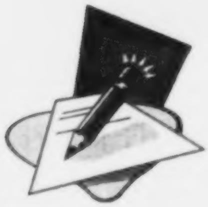
In general, if any alteration to your building drain or any change in commercial activity affects the wastewater discharge, you are required to submit a report by a professional engineer to the city. Some municipalities also restrict the discharge of storm water into the sanitary system. Contact your municipal clerk's office for information (See Appendix 1).

If you're not sure of what has been sent to the drain in the past, simply take a look at your sinks. In most printing plants, the sinks are no longer white. And the areas around the sinks are an odd mixture of stains as well. An easy way to get control of what's discharged to drain through the sink is to first replace the sink. Then scrub down and paint the area surrounding it. There are many good urethane floor paints that hold up well, so even the floor can be painted.The last step is to post a sign above the sink that reads **"No solutions containing ink, solvents, fountain solution or other chemicals can be disposed of in this sink!"** Produce this sign on your computer and have the sign laminated. Now, if someone disposes of contaminants down your sink, your new white sink will alert you.

4. **Compliance Testing**
Some plants test for sanitary sewer compliance every six months and storm water every year. The frequency that is best for your site depends on your comfort level in knowing what is being discharged to the sewer.

Checklists

Section 3: Evaluating Your Business



Introduction

This Section contains checklists for you to use in examining where and how to incorporate P2 into your business. The Section is divided into six subsections. Each subsection contains a checklist, a "to do" list and guidance information. **Make working copies of all checklists to use in your evaluation. Leave the original copies in this binder.**

Table of Contents - Section 3

3.1 Lithography - Prepress

Checklist 3-2
To Do List 3-7
Guidance 3-8

3.2 Lithography - Pressroom

Checklist 3-10
To Do List 3-17
Guidance 3-18

3.3 Screen Printing - Prepress

Checklist 3-27
To Do List 3-30
Guidance 3-31

3.4 Screen Printing - Prepress & Post-Press

Checklist 3-32
To Do List 3-35
Guidance 3-36

3.5 Plant

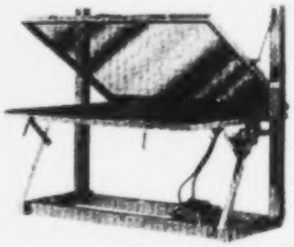
Checklist 3-39
To Do List 3-43
Guidance 3-44

3.6 Property

Checklist 3-48
To Do List 3-54
Guidance 3-55

Notes

3.1 Lithography Prepress - Checklist



Date completed ____________

The prepress department of your facility offers many opportunities for pollution prevention. In this subsection we'll examine film processing chemicals, silver recovery, wash water conservation, platemaking and proofing.

Make a copy of this Section to use in your review. Leave the original in the binder.

Film

1. Electronic prepress is used for making changes to film size, content, orientation and for making duplicates and proofing. Yes ☐ No ☐

2. Film is stored according to the manufacturers' recommendations. Yes ☐ No ☐
   i. Film is marked with a *best before date* when it is received. Yes ☐ No ☐
   ii. Film not used before that date is tested before discarding it. Yes ☐ No ☐
   iii. Incoming supplies of film are inspected and rejected if found damaged or unsuitable. Yes ☐ No ☐

Film Processing Chemicals (general)

3. Chemicals are ordered according to need with minimum inventory kept. Yes ☐ No ☐

4. Chemicals are stored according to manufacturers' recommendations. Yes ☐ No ☐
   All containers are dated when received to ensure *first-in, first-out* usage. Yes ☐ No ☐

5. Bulk solutions and chemical baths are covered to prevent oxidation, solution contamination and vapor emissions. Yes ☐ No ☐

6. Ways to minimize chemical usage have been investigated. Yes ☐ No ☐
   i. Low replenishment chemicals are used. Yes ☐ No ☐
   ii. Dry chemicals are used in a mixer-blender system. Yes ☐ No ☐
   iii. Recycled chemicals are used. Yes ☐ No ☐
   iv. All processors have squeegees or squeegee rollers. N/A ☐ Yes ☐ No ☐
   v. Drag-in, drag-out of chemical contaminants is reduced by adding dripboards and increasing drip time. Yes ☐ No ☐

7. Chemical suppliers have been asked about supplying chemicals in reusable/returnable/recyclable containers. Yes ☐ No ☐
   Containers used are reusable/returnable/recyclable. Yes ☐ No ☐

3.1 Lithography Prepress - Checklist

8. Replenishment rates on all processing equipment have been calibrated according to manufacturer recommendations. ____________ (date they were last calibrated) Yes ☐ No ☐

9. We follow a routine preventive maintenance procedure that includes calibration of replenishment rates. Yes ☐ No ☐

Developer

10. Developer is managed in the following manner:

Method	*Check if used*	*If not checked, explain why not*
Mixed with desilvered fixer and washwater before it is sent to the sewer	☐	____________
Mixed with washwater before it is sent to to sewer	☐	____________
Sent off-site for treatment and disposal	☐	____________

(Note: due to its high pH, developer by itself *must not* be sent to the sewer.)

Fixer

11. Fixer is managed in the following manner:

Method	*Check if used*	*If not checked, explain why not*
Desilvered on-site using metallic replacement cartridge(s) only	☐	____________
Desilvered on-site using electrolytic recovery	☐	____________
We use an in-line recirculating electrolytic unit.	☐	____________
We use a terminal batch electrolytic unit.	☐	____________
We use an electrolytic fixer formula.	☐	____________
We tail the electrolytic unit with a metallic replacement cartridge.	☐	____________
Desilvered fixer is mixed with developer and washwater before it is sent to drain.	☐	____________
Recycled either on-site or off-site	☐	____________
Sent off-site for treatment and disposal (Note: due to its low pH, fixer by itself *must not* be sent to the sewer.)	☐	____________

3.1 Prepress - Checklist

If you recover silver on-site, use this box to draw the equipment configuration and label all its parts.

Wash Water

12. Wash water is managed in the following manner:

Method	*Check if used*	*If not checked, explain why not*
Controlled by a solenoid so it only runs when film is being processed	☐	____________________
Recycled using a wash water recirculator	☐	____________________
Recycled on-site with membrane technology	☐	____________________
Using a commercial commingling tank, wash water is mixed with developer and desilvered fixer before it is sent to drain.	☐	____________________

Plates

13. Plates are stored according to the manufacturers' recommendations. Yes ☐ No ☐
    - i. Plates are dated when received to ensure *first-in, first-out* usage. Yes ☐ No ☐
    - ii. Plates are stored to minimize distance to plate exposure frames. Yes ☐ No ☐
    - iii. Plate reshots are tracked by reason and by press. Yes ☐ No ☐
    - iv. Plates used include the following:

Type of plate	*Check if used*
Laser imaged	☐
Electrostatic	☐
Presensitized aluminum	☐

3.1 Prepress - Checklist

14. (Cont.)

Type of plate	*Check if used*
Silver Master (photo direct)	☐
Photopolymer	☐
Other	☐

Types: ____________________

____

Plate Chemicals

15. We use the following *types* of plate chemicals:

Type of plate chemicals	*Check if used*
Water-based (aqueous)	☐
Wipe-on additive type	☐
Solvent-based	☐

16. Plate processor effluent is managed in the following manner:

Method	*Check if used*
Recycled on-site	☐
Recycled off-site	☐
Sent off-site for disposal	☐
Discharged to drain	☐

Plate Processors

17. Aqueous plate processors are equipped with solenoids to minimize wash water usage. Yes ☐ No ☐

    Plate wash water is recirculated. Yes ☐ No ☐

18. Plate processors are equipped with counters. Yes ☐ No ☐
    - i. Chemicals are changed based on plate count. Yes ☐ No ☐
    - ii. Auto replenishment processors are routinely calibrated according to manufacturers' recommendations. Yes ☐ No ☐

Plates Miscellaneous

19. Ovens for baking plates have been temperature calibrated by the supplier to minimize cracked plates or plates showing poor mileage. Yes ☐ No ☐

3.1 Prepress - Checklist

20. Routine maintenance is performed on the plate bender to ensure it's bending squarely. Yes ☐ No ☐

Proofing

21. All jobs are proofed before going to press. Yes ☐ No ☐
    i. The percentage of proofs that are digital _____ %
    ii. The percentage of proofs that are film-based _____ %

22. Proofing chemical effluent is managed in the following manner as recommended by the manufacturer:

Method	*Check if used*
It is water-based and discharged to drain.	☐
It is water-based and sent off-site for disposal.	☐
It is solvent-based and sent off-site for disposal.	☐
The rinse water is recycled with a water recirculator.	☐

23. Now that you have worked through this subsection, review your answers. For every item that you answered *No*, list follow-up activities on the TO DO LIST on the next page. These are activities that you *must* do in order to answer *Yes* to the item.

For example, if you answered *No* to the item "Plates are dated when received to ensure *first-in, first out* usage," then you should make a note on the TO DO LIST about instituting a policy to date the boxes of plates.

If you need more information in order to respond to a statement on the checklist, refer to the Guidance Section, beginning on page 3-8. The number of the statement in the checklist corresponds to the number of the explanation in the Guidance Section.

Consider this subsection complete when you're able to provide all the information requested, answer *Yes* to all the items or provide a rationale for a *No* answer. Store the completed document in your environmental file.

TO DO LIST

Prepress

CHECKLIST ITEM #	ACTIVITY	DATE NEEDED	COMPLETE

3.1 Prepress - Guidance

Checklist Item Number **Guidance Information**

1. **Electronic Prepress**
Technology now allows printers to eliminate the classical way of producing an image on a lithographic plate. In the past, images were photographed, text was type set, and images of each were transferred to film with a camera in a dark room. Strippers then cut up the film and pasted it onto flats of film. These were used to burn the image onto a lithographic plate. As shown in Appendix 10, there were nine separate waste streams to get to the point were there was an image on the plate.

In the recent past, larger printers could afford to output to a film setter. Smaller printers were hard pressed to make the capital commitment, but prices were falling as capability and speed increased.

Today, we can scan the photographs into a computerized prepress workstation. The text is imported electronically or typed onto the image on the keyboard of the work station. This is available to all printers no matter what size or annual sales they enjoy. Output devices include laser printers.

Large printers can also afford to go computer-to-plate (CTP). The entrance cost is approaching $1,000,000 for an automated system (1998 prices). This technology is now available for the small printer for $8,400.00. Where small printers were able to photocopy a paper plate and run 100 or 200 copies, the polyester plates from this system will run upwards of 30,000 impressions and are guaranteed for 20,000. For more information, contact your graphic arts supplier.

3.-11. **Film Processing Chemicals and Silver Recovery**
It is beyond the scope of this guidance to detail the chemicals and chemical reactions that are involved in processing film from a light sensitive sheet to a high resolution image on acetate.

If you are interested in the science related to graphic arts, there is a text book entitled *Chemistry for the Graphic Arts* available from the Graphic Arts Technical Foundation at (412) 621-6941. Some of the material that follows is from that source.

When black and white film is processed, it is passed through a developer where any silver that has been exposed to light is changed to a metallic silver. Metallic silver is black, hence the black colour of a negative. The fixer dissolves the silver that was not developed, and "fixes" the reaction of the developer so that the film does not fog. The wash rinses the fixer from the film.

There are three parameters in film processing chemicals that are generally affected by regulations:

3.1 Prepress - Guidance

Checklist Item Number **Guidance Information**

1) Biochemical oxygen demand (BOD) - The chemicals used in processing and hardening film images are mostly biodegradable. The bacteria used at the water treatment plant to biodegrade these chemicals need oxygen to do their job. If the chemicals decrease the oxygen level to below life-sustaining levels, the bacteria are affected and the water treatment plant will cease to work. This is why BOD is so important to municipal water treatment plants.

2) Silver is a contaminant in the fixer and small amounts are carried over to the wash water. Silver should be recovered because it is a natural and nonrenewable resource, it has economic value, and it is regulated in some municipalities. Two common systems for recovering silver are electrolytic and metallic replacement. The silver can also be recovered by an outside service that manages the silver off-site.

Sewer use bylaws typically limits the concentration of silver in wastewater to 5 mg/L or less as measured at the property line. For EcoLogo certification, the point of measurement is after the terminal silver recovery unit(s). While silver-estimating papers can be used to get a rough approximation of whether your silver recovery system is working, the only way to measure silver accurately is through Atomic Absorption (AA) or Inductively Coupled Plasma Spectroscopy (ICP). Both methods require the services of a reputable analytical laboratory. In many cases, your silver recovery equipment vendor will provide this testing for you. Contact silver recovery equipment and service providers to find out the best silver recovery options for your situation.

3) The developer is alkaline and the fixer is acidic. By themselves either one will fall outside the typically regulated pH range of 5.5 - 9.0. Mix the developer with the desilvered fixer and washwater before discharging them to drain (sanitary sewer).

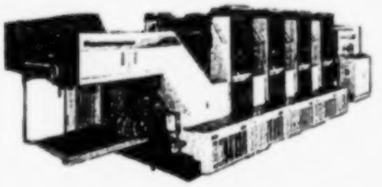
13. **Plates**
Improper baking or over baking is the main cause of cracked plates, or plates showing poor mileage on the press.

20. **Plate Bender**
Many printers experience cracked plates, poor register or unmountable plates because of a lack of maintenance and quality control on the plate bender. Maintaining this often ignored piece of equipment is critical to avoiding these problems along with the wasted time, energy and paper they create.

See Appendix 9. Common Chemical Product Management

3.2 Lithography Pressroom - Checklist

Date completed ____________



You may find the greatest pollution prevention opportunities in the pressroom. In this Section, we'll examine paper waste, blankets, rollers, parts cleaning, fountain solution and inks.

Make a copy of this Section to use in your review. Leave the original in the binder.

Makeready Waste (general)

1. Makeready waste is minimized by using the following procedures:

Procedure	*Check if used*	*If not checked, explain why not*
A basic scheduled maintenance procedure is followed for all presses.	☐	
A chart of recommended press settings for each press using the most common paper and ink combinations has been developed.	☐	
Any problems with paper/ink combinations are documented along with their solutions.	☐	
Paper, ink, press and press settings are recorded on the job bags for any jobs that might be re-run in the future.	☐	
The number of press clean-ups and colour changes are reduced by using a standard sequence for process colours.	☐	

Paper Waste

2. Paper waste is minimized by using the following procedures:

Procedure	*Check if used*	*If not checked, explain why not*
Paper waste is tracked by docket.	☐	
Paper waste is tracked by press.	☐	
Paper waste is tracked by crew.	☐	
Paper waste is tracked by type and grade of paper.	☐	
Paper waste is closely monitored when we're trying new chemicals or suppliers.	☐	

3.2 Pressroom - Checklist

Paper quality problems are tracked and costs are back-charged to the paper supplier. ☐ ____________________

Solvent Use (general)

3. The use of highly hazardous solvents is minimized by using the following procedures:

Procedure	*Check if used*	*If not checked, explain why not*
Detergent solutions are used in place of solvents for general cleanup.	☐	____________________
Solvents with a high hazard rating are reserved for only those tasks where they are really needed.	☐	____________________
Access to solvents is controlled by dispensing them from a central storage area.	☐	____________________
Used solvents are recovered and re-used for initial cleaning of parts in washers etc.	☐	____________________
If changing solvents, press operators are provided with thorough instructions for using new solvents.	☐	____________________

Blanket Cleaning

4. Waste from blanket cleaning is minimized by using the following procedures:

Procedure	*Check if used*	*If not checked, explain why not*
Environmentally-responsible blanket washes are being used (see guidance, item 2).	☐	____________________
Solvents used for blanket washing are recycled on-site.	☐	____________________
Solvents used for blanket washing are recycled off-site.	☐	____________________
Automatic blanket washers are used.	☐	____________________
Safety cans, pumps or squirt bottles are used to deliver controlled amounts of solvent to wipers.	☐	____________________
Blanket washing is done with cloth wipers.	☐	____________________
Cloth wipers are laundered on-site.	☐	____________________

3.2 Pressroom - Checklist

4. (Cont.)

Procedure	*Check if used*	*If not checked, explain why not*
Solvents from the cloth wipers are collected and recycled on-site.	☐	
Solvents from the cloth wipers are collected and recycled off-site.	☐	
Cloth wipers are laundered off-site in an environmentally-responsible manner	☐	
Both solvents and wipers are taken for off-site disposal by a registered waste hauler.	☐	
Blanket washing is done with sponges.	☐	
Blanket washing is done with paper wipers.	☐	
Paper wipers are disposed of properly.	☐	
Blanket washing liquid from press buckets is collected for recycling.	☐	
Solvents and solvent saturated wipers are kept in closed containers to minimize evaporation and vapor emissions.	☐	

Blanket Maintenance

5. Blankets are maintained by using the following procedures:

Procedure	*Check if used*	*If not checked, explain why not*
Records of blanket mileage are kept.	☐	
Blankets are changed based on the number of impressions (not by quality problems).	☐	
Blankets are quality control checked before mounting.	☐	
Blankets are mounted with a torque wrench.	☐	
Bearers are cleaned routinely.	☐	

Roller Washing

6. Roller washing waste is minimized by using the following procedures:

Procedure	*Check if used*	*If not checked, explain why not*
Roller wash-up blades are inspected and maintained.	☐	

3.2 Pressroom - Checklist

6. (Cont.)

Procedure	*Check if used*	*If not checked, explain why not*
The solution from the wash-up blade is collected for recycling.	☐	
Low or non VOC roller wash-up solutions (vegetable-based) are used.	☐	
Manufacturer recommendations are followed when using prepared roller wash-up solutions.	☐	
Water is used to remove the paper coating build-up from the rollers.	☐	

Roller Maintenance

7. Rollers are maintained using the following procedures:

Procedure	*Check if used*	*If not checked, explain why not*
A log is kept for each roller.	☐	
New rollers are checked for durometer before mounting.	☐	
Rollers in service are routinely checked for durometer, damage and burning.	☐	
Roller shaft bearings are changed when rollers are replaced.	☐	
Rollers are covered when not in use.	☐	
Rollers are suspended by roller end when not in use (not stored on a flat surface).	☐	

Parts Cleaning

8. Parts cleaner stations are used for cleaning press parts. Yes ☐ No ☐
(Where practical, parts are spot cleaned instead of pouring solvent on to parts.)

i. If the parts cleaner is water/detergent-based, we recycle it either on-site or off-site. N/A ☐ Yes ☐ No ☐

ii. If the parts cleaner is solvent-based, we recycle it either on-site or off-site. N/A ☐ Yes ☐ No ☐

iii. If the parts cleaner is caustic-based, we recycle it either on-site or off-site. N/A ☐ Yes ☐ No ☐

3.2 Pressroom - Checklist

Fountain Solution

9. Alcohol substitutes are used in the fountain solution. Yes ☐ No ☐

10. EcoLogo requirements for fountains solution have been met. (See Guidance.) Yes ☐ No ☐

11. Where alcohol is used in the fountain solution, coolers are used to control the temperature to minimize vapours. N/A ☐ Yes ☐ No ☐

12. A standard procedure is followed for mixing fountain solution. Yes ☐ No ☐

13. Filter media is used in the fountain solution recirculating tank. Yes ☐ No ☐

14. Fountain solution is routinely monitored for the following: pH Yes ☐ No ☐
conductivity Yes ☐ No ☐

15. Incoming water is monitored for changes in conductivity, pH and mineral content. Yes ☐ No ☐
    i. Incoming water is treated using reverse osmosis before being used for fountain solution. Yes ☐ No ☐
    ii. The discharge water is used for other processes. Yes ☐ No ☐

16. Spent fountain solution is managed using the following procedures:

Procedure	*Check if used*	*If not checked, explain why not*
Recycled on-site	☐	______________
Recycled off-site	☐	______________
Treated on-site and discharged to the drain	☐	______________
Treated and disposed off-site	☐	______________

Ink

17. Inks are managed using the following procedures:

Procedure	*Check if used*	*If not checked, explain why not*
Accuracy of ink estimation methods is evaluated to assure minimal waste.	☐	______________
Colour specific ink use table is developed to increase accuracy of estimates.	☐	______________
Ink is ordered in containers sized for minimum storage time in opened containers.	☐	______________

3.2 Pressroom - Checklist

17. (Cont.)

Procedure	*Check if used*	*If not checked, explain why not*
Ink cans are dated when opened.	☐	
Ink pails and cans are scraped clean.	☐	
Ink pails and cans are recycled either on-site or off-site.	☐	
Inks are used on a first in first out basis.	☐	

18. Vegetable-based inks are used. N/A ☐ Yes ☐ No ☐

19. Printing inks are selected to ensure the sum concentration levels of lead, cadmium, mercury or hexavalent chromium is less than 100 parts per million (ppm) by weight. Yes ☐ No ☐

20. Anti-skinning spray is used on ink fountains overnight. N/A ☐ Yes ☐ No ☐

21. Inks collected from cleaning fountains are disposed of properly by a licensed carrier. Yes ☐ No ☐

22. Jobs are organized to reduce the shifting of colours between units. Yes ☐ No ☐

23. Standard colours are used whenever possible to decrease ink inventory. Yes ☐ No ☐
    Colours are mixed on-site to save cost and decrease inventory. Yes ☐ No ☐
    (Contact your ink supplier for more information.)

24. Automatic ink fountain levelers are used on all the presses. Yes ☐ No ☐

25. Ink fountains are filled with pumps (i.e., black ink for cold set presses). N/A ☐ Yes ☐ No ☐

26. Waste heat set and cold set inks are managed in the following manner: N/A ☐

Procedure	*Check if used*	*If not checked, explain why not*
Collected and blended into black ink	☐	
Collected for recycling by colour	☐	
Collected and recycled on-site	☐	
Collected and recycled off-site	☐	

3.2 Pressroom - Checklist

27. Now that you have worked through this subsection, review your answers. For every item that you answered *No*, list follow-up activities on the TO DO LIST on the next page. These are activities that you *must* do in order to answer *Yes* to the item.

For example, if you answered *No* to the item "Automatic ink fountain levelers are used on all the presses," then you should make a note on the TO DO LIST about investigating this equipment.

If you need more information in order to respond to a statement on the checklist, refer to the guidance Section, beginning on page 3-18. The number of the statement in the checklist corresponds to the number of the explanation in the guidance Section.

Consider this subsection complete when you're able to provide all the information requested, answer *Yes* to all the items or provide a rationale for a *No* answer. Store the completed document in your environmental file.

TO DO LIST

Pressroom

CHECKLIST ITEM #	ACTIVITY	DATE NEEDED	COMPLETE

3.2 Lithography Pressroom - Guidance

Checklist Item Number **Guidance Information**

2. **Minimizing Paper Waste**

The Graphic Communications Association has published a book entitled *War on Waste II - How To Reduce Paper Waste in Web Printing*, by Roger Dickenson. The following is an excerpt from this book.

To minimize waste:

1) Concentrate on press impressions makeready and running.
2) Establish a reliable and consistent means of measuring makeready and running waste impressions.
3) Determine current experience in average makeready impressions required and percentage of running waste to net good impressions.
4) Establish an initial desired objective for makeready impressions and running waste percent.
5) Communicate the measurements and objectives to all personnel.
6) Ask for ideas and methods to improve makeready and running waste.
7) Support operating personnel by accomplishing suggested projects.
8) Feed back the waste measurements at least weekly, convene discussions/ meetings to discuss progress and additional projects.
9) Recognize and celebrate progress as it occurs.
10) Don't send or communicate job standards for waste or production speeds used in pricing evaluations to the production floor.
11) Continue to feed back waste performance information and convene meetings until continuous reduction of makeready and running waste impressions have become the culture of the company.
12) Keep the measurements simple and use graphs to present information.

We have listed many items in this guide that are process- and quality-related. This may seem strange in an document about pollution prevention. To again quote Dickenson:

"Often we hear the expression,'Well if you want quality then you can expect waste to increase.' This is nonsense. The statement should be, 'Well, if you want waste to decrease then you must increase quality.' Efforts to reduce waste and efforts to improve quality are synonymous, opposite sides of a single coin. Example: If you wish the average impressions per press makeready to decline, you must optimize plate, film, fountain solution, blanket and press condition. A quality improvement program is a waste reduction program and a waste reduction program is a quality improvement program."

War on Waste II - How To Reduce Paper Waste in Web Printing is available from the CPIA bookstore (phone: 613-236-7208 or fax: 613-236-8169). They would be pleased to send you a copy of their bookstore catalogue entitled *Printers' Resource Catalogue*.

3.2 Pressroom - Guidance

Checklist Item Number **Guidance Information**

3. **Solvent Use (general)**
See Appendix 7 "Using MSDS for Solvent and Chemical Solutions."

4. **Blanket Cleaning**
There are many nonsolvent-based alternatives on the market. Their cost is two to 10 times that of solvent on a per gallon basis. Many are water mixed, however, and are effective in much lower quantities than solvent, resulting in a possible cost savings. There are also alternatives that have a high vapour pressure and, therefore, do not evaporate into the air of the pressroom.

EcoLogo certification has specific requirements for blanket washes. To qualify, you must use blanket washes having the following:

- a volatile organic compound (VOC) content (as used) less than or equal to 30 percent by weight, as tested in accordance with EPA Test Method 24, or
- a VOC composite partial vapour pressure (as used) less than or equal to 10 mm Hg (mercury) at 20 degrees C, as tested in accordance with ASTM D5191-91 *Test Method for Vapor Pressure of Petroleum Products (Mini Method).*

Vapour pressure is another method of measuring a product's volatility or ability to evaporate. We have all seen a lawn mower gas can or isopropyl alcohol can expand in hot weather. The can almost seems as if it will burst. That expansion is a great demonstration of vapour pressure. Volatile organic compounds (VOCs) have a tendency to expand and try to evaporate. Frequently, as the temperature increases, the volatility of vapour pressure increases. *(This information was adapted from the Varn Internet World Wide Web site.)*

How do you measure vapour pressure? With a mercury measuring device, similar to a barometer used to measure barometric pressure. This mercury measuring device measures vapour pressure of a volatile organic compound. The vapor pressure rule states that any blanket wash which measures less than 10mm of mercury (Hg) at 20 degrees C (about room temperature) can be considered a low VOC product equal to a product with less than 30 percent VOCs using Method 24. *(This information was adapted from the Varn Internet World Wide Web site.)*

Automatic Blanket Washers
Automatic blanket washers are available for web and sheetfed presses. They perform six functions when looked at from a pollution prevention standpoint:

1) Blankets are washed when they should be instead of when they have to be. This reduces running waste and increases the average quality of the finished job.
2) Use of solvents is decreased.
3) Use of wipers is decreased.
4) Running waste from the blanket wash is reduced.

3.2 Pressroom - Guidance

Checklist Item Number | **Guidance Information**

5) Blanket wash isn't spilled or slopped into ink fountains and water fountains necessitating more frequent cleaning and waste.
6) Press time to wash blankets is reduced, thereby saving energy.

There are three types of automatic blanket washers:

- The simplest is a spray bar system where the blanket contamination is carried away by the paper. These are only effective on heatset web presses, where the solvent from the washer and the ink residue is dried in the oven.

- The next simplest is a rotating brush that contacts the blanket, as water and solvent are sprayed on and a brush contacts the blanket. The paper lint is caught in a tray. These are effective for all presses.

- The most elaborate system uses both a spray bar and a roll of cloth. The paper lint and residue ink are carried off of the blanket by the cloth. In most instances, the cloth can be landfilled because it contains only very small quantities of solvent.

A dampened wiper is more effective in blanket cleaning that a sopping wet wiper. Dampening cans and squirt bottles will reduce solvent or cleaner use and keep the pressroom free of trails of dripping cleaners. They will also reduce the amount of blanket wash in the fountain solution tray.

Your press manufacturer may also have a retrofit system for your press. Any of the manufacturers can put real world numbers to the cost of the system and the return on investment based on reduced paper waste, solvent usage and press time.

Throwing wipes soaked with solvent in the garbage is not a compliance option. They must be disposed of as a hazardous waste.

5. **Blanket Maintenance**

Worn or smashed blankets give poor results. Often a blanket that has run too long causes quality problems that necessitate a job rerun or at least putting a job back on the press. Long runs should be started with new blankets if the blanket mileage is high.

A leading cause of blanket problems is improper mounting. Check with the blanket manufacturer to be sure the mounting procedures are appropriate. Press operators should be trained by the manufacturer of the blanket if a new blanket is tried that has a different mounting procedure.

Checklist Item Number **Guidance Information**

Torque wrenches are a must if your press has blanket lockups that use a socket or an allen wrench. The torque wrench should not be taken for granted, as an out-of-tolerance torque wrench is worse that not using one at all. They can be calibrated by your tool supplier. If you can't get a replacement or loaner while your torque wrench is being repaired, the practice of reliably torquing blankets will end. Blanket suppliers will gladly come to crew meetings to talk about proper blanket mounting and care. Use this valuable resource.

6. **Roller Washing**
Many new presses have automatic roller washing as an option. Be sure that wash-up blades are maintained according to the manufacturer's specifications.

7. **Roller Maintenance**
Rollers have a life span as they harden in service. A log is a useful way to determine average life so that rollers get changed when they should, instead of when they cause quality problems.

Roller manufacturers make many different rollers in a day. You should be sure that yours were made to your specifications rather than to someone else's. The durometer that you request will be based on your experience, the alcohol content of your fountain solution (if any), the press manufacturer's recommendations, and the ink you are using.

Roller durometer will shift when the roller is exposed to air and light. This is caused by the polymers in the roller material being cross-linked by ozone in the air and ultraviolet light. Roller durometer can also shift in service when the rollers are exposed to pressroom chemicals. Be especially suspicious of durometer shift when trying a new blanket wash, roller wash or other cleaning chemical.
Part of each makeready should be to inspect one bank of rollers for damage.

Bearings on rollers should be installed with an arbour press by press operators who have had training from the bearing manufacturer. Most bearing failures start when the bearing is improperly installed. Bearings are designed to operate for many thousands of hours, yet improper mounting can reduce that to a few shifts. Bearing manufacturers have technical representatives that will come in to give a one or two hour course on bearing mounting and maintenance.

On older equipment, ensure that the bearings being used are the most suitable for the application. Many press rollers come with shielded bearings, yet sealed bearings may be the most effective. Some brush dampening rollers have shielded bearings, yet press operators wash the roller by immersing it in solvent. This washes the lubrication from the unsealed bearing. If an alternate bearing is

3.2 Pressroom - Guidance

Checklist Item Number | **Guidance Information**

installed on a press because it is cheaper or available, then the next time the bearing is replaced, the off-spec bearing will become the standard. Check what you find on the press against what the parts book says should be there. Be sure to have the proper bearings on hand.

Why so much attention to bearings? A roller that seizes in the press will destroy other rollers, fill the roller train with chunks of roller material, and create a large delay in the press schedule. It will also necessitate an added makeready, and possibly involve running on two presses to meet delivery schedules. This doubles makeready and waste.

Store rollers vertically if possible. Rollers stored on their side and contacting the bench with the roller surface will go flat. Rollers stored on their journals will, in time, go out of round as the material sags on the shaft.

8. **Parts Cleaning**

Parts cleaning stations are an effective way to control solvent usage. Many press operators still clean rollers and trays by holding them over the wiper bin and pouring solvent on them. They do this not to be environmentally irresponsible, but because they have not been given an alternative that is faster, or works better. Oversized parts washers are available, or can be manufactured by local welding shops or the maintenance department. Some printers use spent blanket wash for these units. The blanket wash is then disposed of as a hazardous chemical. Others use a solvent parts cleaner service to recycle the solvent on-site or off-site.

If you employ an oversize parts cleaner be sure that the solvent pump is suitable for the solvent being used. If the solvent is flammable be sure that the lid of the parts cleaner is on a fusible link so it will close if there is a fire. Your safety supply company can supply fusible links.

Be sure that solvent or any flammable liquid is not stored or used from an open top plastic container. If there is a fire in the container, the container will melt and the burning solvent will spread.

10. **EcoLogo Requirements for Fountain Solution**

EcoLogo certification carries the specific following requirements for fountain solutions.

- Heatset web lithographic printing services must:
  - (a) not use products formulated or manufactured with isopropyl alcohol in press dampening systems;
  - (b) use a fountain solution having a VOC content:
    - (i) that does not exceed 1.6 percent by weight of formulation (as used) as calculated from records of the amounts of constituents used to make the product; or

  - (ii) that does not exceed 3.0 percent by weight of formulation (as used) as calculated from records of the amounts of constituents used to make the product, and refrigerate the fountain solution to 60 degrees F or less; or
  - (iii) that does not exceed 5.0 percent by weight of formulation (as used) as calculated from records of the amounts of constituents used to make the product, and that uses no alcohol in the fountain solution;

- Nonheatset web lithographic printing services must:
  - (a) not use products formulated or manufactured with isopropyl alcohol in press dampening systems; and
  - (b) operate a nonheatset web lithographic printing press or newspaper offset lithographic printing press that uses a fountain solution having a VOC content that does not exceed 5.0 percent by weight of the formulation (as used) as calculated from records of the amounts of constituents used to make the product, and that uses no alcohol in the fountain solution.
- Sheetfed lithographic printing services must:
  - (a) not use products formulated or manufactured with isopropyl alcohol in press dampening systems; and
  - (b) use a fountain solution having a VOC content:
    - (i) at or below 5.0 percent by weight of the formulation (as used) as calculated from records of the amounts of constituents used to make the product; or
    - (ii) at or below 8.5 percent by weight of formulation (as used) as calculated from records of the amounts of constituents used to make the product, and refrigerate the fountain solution to 60 degrees F or less;
  - (c) use no alcohol in the fountain solution.

13. **Filter Media**
Filter media can effectively extend the life of the fountain solution by trapping paper dust and ink residue.

14. **Fountain Solution pH and Conductivity**
Fountain solution should be tested for pH and conductivity before being poured into the press tank. This holds true whether the solution is mixed manually or automatically. From a water quality standpoint, pH is important and can drift when you're printing on alkaline papers. However, it is conductivity that reveals how strong the fountain solution has been mixed. For proof of this ask your fountain solution supplier for a pH and conductivity chart for the fountain solution you are using.

If you are doing trials on new fountain solutions, ask the supplier to have a technical representative at your plant when the product first goes on press. Your

3.2 Pressroom - Guidance

Checklist Item Number **Guidance Information**

press operators will need some guidance if the fountain solution is significantly different from what you are using now.

15. **Water Treatment**
If you suspect your water may be of varying quality, check the pH and conductivity twice daily both at the start and end of the day shift. A one-month period should show you any trends. Some municipal water systems change their source of water depending on the season. By law, the municipality must take water quality measurements daily. They can, therefore, tell you of any trends and give you their measurements. Show these to your fountain solution supplier for guidance.

Some plants find it necessary to soften their water with a water softener, and some plants must use reverse osmosis (RO). Your fountain solution will have to be chemically adjusted if you install a reverse osmosis unit. Contact your fountain solution supplier for help.

Beware the water treatment salesman who tells you of the virtues of the RO unit without showing you proof that you need it because of your varying water quality.

16. **Managing Spent Fountain Solution**
Even if you use a fountain solution with reduced environmental impact, the spent fountain solution contains ink and blanket wash residue. As all sewer use codes insist on no solvents or hydrocarbons being sent to drain, **spent fountain solution cannot be disposed of down the sewer**. It must either be treated on-site prior to sewering or hauled as liquid industrial waste.

There are two alternatives for recycling and treating fountain solution:

- Membrane technology can be used to clean the fountain solution for reuse or disposal. (The average price in 1998 is $10,000 to $15,000.)

- The fountain solution can be evaporated in a waste water treatment evaporator. This reduces the fountain solution to a sludge that is approximately five percent of the original volume and may reduce haulage fees. (The average price in 1998 is approximately $30,000.)

17. **Ink Inventory Management**
Opened cans should be lined with plastic film or waxed paper to keep air away from the surface of the ink.

Unopened cans can sometimes be sent back to the manufacturer if quantities ordered were more than required for the job.

Run ink fountain levels down to the minimum by the end of the job. Ink fountain returns are a hazardous waste. Excess ink in the can is a nonhazardous product.

3.2 Pressroom - Guidance

Checklist Item Number **Guidance Information**

Some ink companies will take back partial cans of virgin ink depending on the level of business you do with the company. Some larger printers can remix this ink in their in-house ink facility into other colours.

There is software available that allows smaller printers to successfully mix their own colours. This is based on the Pantone system. The software lets the printer mix custom colours by customer or custom name. Previously mixed spot colours can be changed to a new colour. Excess ink can then be worked off on another job. A printer can blend spot colours and avoid the up-charge from the ink company for small quantities. From a pollution prevention standpoint, the printer should mix only what's needed, and remix excess inventory into something that can be used. Your ink supplier can give you more information.

18. **Vegetable-Based Inks**

Printing ink can be simply described as a pigment which gives colour, and a vehicle which carries the pigment and gives the performance characteristics of the ink. A solvent is part of the vehicle. In a vegetable-based ink, some of the hydrocarbon solvent is replaced with vegetable oil such as soya oil. Not only is the soya oil a renewable resource, but in some ways, it improves the performance of the ink. Newspapers find that colour is improved and some reports claim that ink mileage is increased. Your ink supplier can offer you alternatives that will suit your customer base and printing equipment.

Don't judge ink on a price per kilo basis. Price per kilo only indicates how much solvent you are buying, not how good the ink is. Mileage tests tell the tale and will save you substantial dollars in the long run.

19. **Constituents of Printing Inks**

Ask your ink supplier for a letter confirming that the sum concentration levels of lead, cadmium, mercury or hexavalent chromium is less than 100 parts per million by weight.

20. **Anti-Skinning Spray**

This is available from your ink supplier. It is an anti-oxidant like BHT that is used in food product, and ink solvent. Sprayed into the roller train, it can prevent the ink from drying until that ink has run off of the rollers. However, this is not generally a problem when used in the ink fountain.

21. **Ink from the Fountain**

Ink is not classified as a hazardous waste in Atlantic Canada unless it is significantly contaminated with a hazardous waste such as a solvent or alcohol from the fountain solution. Used ink, however, can not be landfilled without being processed. It does not need to be manifested to be shipped but it does need to be documented with a waybill. The easiest way to ensure that it is disposed of

3.2 Pressroom - Guidance

Checklist Item Number	Guidance Information
	properly is to use a licensed carrier. Be sure to get several price quotations as you'll find that pricing will vary.
22.	**Organizing Jobs by Colour** This reduces fountain cleaning and the generation of waste ink. It also reduces waste as makereadys are shorter.
24.	**Automatic Ink Levelers** It is good practice to shut off the ink levelers and let the ink fountain levels run down before changing colours. For more information, read the Guidance for item 14.
25.	**Ink Fountain Pumps** Pumping ink is effective in eliminating kits and the waste that is generated with their use. An empty barrel of ink will contain less residual ink than the corresponding number of kits or cans. There is also less contamination brought into the ink fountain.
26.	**Ink Recycling** Some plants have experience in filtering and adjusting their own fountain return ink. Your ink supplier can direct you to area printers that have done this successfully. In the past, newspapers have blended unfiltered fountain returns with virgin ink but recent demands for quality in newspaper print have virtually eliminated this practice. Sheetfed inks are not recyclable as they dry by oxidation, and the dryers are built into the ink. Fountain returns from sheetfed presses invariably contain skin and semihardened ink that mean the ink can't be recovered.

See Appendix 9. Common Chemical Product Management

3.3 Screen Printing (Prepress) - Checklist

Date completed ____________

For screen printers who still use **photographic processes**, please refer to Section 3.1 for appropriate checklist (Film, Developer, Fixer, Wash Water). Copy the relevant sections of the checklist from Section 3.1 and keep it in your company profile with the following sections.

Prepress

1. Employee training is provided for every aspect of the work. Yes ☐ No ☐

2. Jobs are planned to increase efficiency and reduce wastes by:
   - i. preparing only the amount of ink needed for the job. Yes ☐ No ☐
   - ii evaluating the accuracy of ink estimation method to assure minimal waste. Yes ☐ No ☐
   - iii. organizing print jobs to maximize the use of ink. Yes ☐ No ☐
   - iv. scheduling jobs so that there is minimum delay in cleaning screens. Yes ☐ No ☐

3. Use water-based platen adhesives to reduce VOC emissions. Yes ☐ No ☐

4. Use other screen adhesives to reduce VOC emissions. Yes ☐ No ☐

Chemical Control

5. Chemicals are ordered according to need with minimum inventory kept. Yes ☐ No ☐

6. Chemicals are stored according to manufacturer's recommendations. All containers are dated when received to ensure first-in, first-out usage. Yes ☐ No ☐

7. Bulk solutions and chemical baths are covered to prevent oxidation, solution contamination and vapor emissions. Yes ☐ No ☐

8. Ways to minimize chemical usage have been investigated.
   - i. Low replenishment chemicals are used. Yes ☐ No ☐
   - ii. Dry chemicals are used in a mixer-blender system. Yes ☐ No ☐
   - iii. Recycled chemicals are used. Yes ☐ No ☐
   - iv. Drag-in, drag-out of chemical contaminants is reduced by adding dripboards and increasing drip time. Yes ☐ No ☐

9. Chemical suppliers have been asked about supplying chemicals in reusable/returnable/recyclable containers.

   Containers used are reusable/returnable/recyclable. Yes ☐ No ☐

10. Requested information from vendors about nonhazardous or less hazardous, alternative chemicals. Yes ☐ No ☐

3.3 Screen Printing (Prepress) - Checklist

Inks

11. Inks are properly managed using the following procedures:
    - i. Ink is ordered in containers sized for minimum storage time in opened containers. Yes ☐ No ☐
    - ii. Ink cans are dated when opened. Yes ☐ No ☐
    - iii. Ink pails and cans are scraped clean. Yes ☐ No ☐
    - iv. Ink pails and cans are recycled either on-site or off-site. Yes ☐ No ☐
    - v. Inks are used on a first-in, first-out basis. Yes ☐ No ☐

12. Water-based graphic and UV curable inks are used whenever possible to reduce VOC emissions. Yes ☐ No ☐

13. Plastisol and water-based textile inks are used whenever possible to reduce VOC emissions. Yes ☐ No ☐

14. Use water-based inks with less than 3.3 lbs per gallon or 400 grams per liter where feasible. Yes ☐ No ☐

15. Printing inks are selected to ensure the sum concentration of lead, chromium, mercury or hexavalent chromium is less than 100 parts per million (ppm) by weight. Yes ☐ No ☐

16. Colours are mixed on-site to save cost and decrease inventory. (Contact your ink supplier for more information.) Yes ☐ No ☐

17. Use ink thinners with less toxic ingredients. Yes ☐ No ☐

18. Waste ink from cleaning process are collected. Yes ☐ No ☐

19. Waste ink are handled as a hazardous waste. Yes ☐ No ☐

Solvents

20. The use of highly hazardous solvents is minimized by using the following procedures:
    - i. Access to solvents are controlled by dispensing them from a central storage area to minimize its use. Yes ☐ No ☐
    - ii. Extra care is taken when mixing solvents to inks for respective jobs to minimize errors and thus wastes. Yes ☐ No ☐
    - iii. Solvents with a high hazard rating are reserved for only those tasks where they are really needed. Yes ☐ No ☐
    - iv. Used solvents are recovered and re-used for initial cleaning of parts. Yes ☐ No ☐
    - v. Hazardous solvents that have high VOC and high vapour pressure are replaced with less hazardous solvents. Yes ☐ No ☐

3.3 Screen Printing (Prepress) - Checklist

Solvent Soaked Rags

21. Solvent use in cleaning rags is minimized by using the following procedures:
    - i. Solvent is applied to a screen or machine parts directly using a spray bottle. Yes ☐ No ☐
    - ii. Solvent soaked rags are reused as many times as possible. Yes ☐ No ☐
    - iii. Solvent soaked rags are kept in a tightly closed container to prevent solvent evaporation and emission. Yes ☐ No ☐
    - iv. Solvent soaked rags are sent to an industrial laundry to be cleaned in an environmentally responsible manner. Yes ☐ No ☐

22. Solvents are collected from used rags on-site (via gravity draining or centrifuging) and reused. Yes ☐ No ☐

Adhesives

23. The amount of solvent based adhesives used in textile screen printing operations are reduced by using water based adhesives (very fine spray of a water based adhesives would dry quickly and not clog nozzles.) Yes ☐ No ☐

Used Oil

24. Used oil is not mixed with other wastes, particularly hazardous solvents. Yes ☐ No ☐

TO DO LIST
Screen Printing

CHECKLIST ITEM #	ACTIVITY	DATE NEEDED	COMPLETE

3.3 Screen Printing (Prepress) - Guidance

Checklist Item Number **Guidance Information**

Prepress

Training

1. Your employees are integral to the success of your companies pollution prevention program and they should be encouraged to actively participate in the program. Often the best, most practical and workable solutions come from the shop floor. Using training to raise employee awareness is often the best way to get employees to actively participate in a pollution prevention program. Many companies recognize and reward good ideas that come from the staff. This will provide an incentive for the employees to be conscientious about the work that they do, and to continuously search and explore various technologies or methods that can reduce costs and/or improve working conditions and minimize the company's impact on the environment.

Chemicals

5. Common chemicals used by screen printers:

- Ink remover - varsol
- Emulsion remover - sodium metaperiodate solution (does not cause burns) is a little more expensive than the traditional remover, but as it is highly concentrated, companies use less.
- Haze remover - sodium hydroxide or sodium hypochlorite

Chemical overspray not directed at the screen during emulsion and haze removal can be one of the biggest sources of chemical loss. A "catching frame" can be built and placed around the screen to capture the overspray which is then recycled or reused (US EPA, 1994a).

Selecting Chemical Alternatives:

10. The following issues should be considered when selecting chemical alternatives: potential health risk to employees, performance, quantity used (is more required to do the same job?), cost, employee acceptance (perceived benefit), effectiveness (cleaning time), effect on substrate (detrimental effects to the screen), effect on print quality and disposal.

Inks

11. Increase the accuracy of ink mixing and use by using computer controlled ink mixing program equipped with a digital scale for weighing inks, thus reducing waste.

12. Water-based inks do not require organic solvents when cleaning the presses and, if free of heavy metals, do not produce hazardous wastes (save on hazardous waste disposal costs). Water based inks are less expensive than solvent based inks and are similar in quality, gloss, and adhesion. However, a longer drying period is needed for water-based inks than solvent-based ink.

3.3 Screen Printing (Prepress) - Guidance

Checklist Item Number	Guidance Information
	UV-cured inks give high gloss finish to the product. Runs involving solvent-based inks may be cleaned every 100 to 150 sheets to ensure ink would not dry on the screens. This affects the consistency of the batches for color shades and clarity. With UV-curable inks, runs need not be frequently interrupted for cleaning to ensure consistency.
	Solvents
20.	Solvents are used during the screen printing process to remove dried ink left on screen overnight or during lunch breaks. Traditional solvent cleaners are typically high in VOCs. Instead, select solvents that evaporate more slowly and produce less VOC emisions. Companies will reduce the total quantity of solvents used, since press operators will need less of the slower-evaporating solvent to do the same job, in addition to reducing the VOC emissions. These lower vapour pressure cleaning solvents should only be used when the press run has been completed. These solvents are very aggressive and will begin to erode the stencil thereby making the screen unusable for further printing operations.
22.	Solvent containing rags - A gravity drain or a centrifuge can be used to reclaim solvents from used rags. If the volume of rags being used is low, then reuse rags as many times as possible before sending them to an industrial laundry. Change rags when changing inks and reuse rags as long as they are running the same colour ink.
	Adhesives
23.	Solvent-based platen adhesives are flammable, and come in aerosol cans creating aerosol can waste (applies only to textile screen operations).

3.4 Screen Printing (Pressroom and Postpress) - Checklist

Date completed ____________

Pressroom

1. Excess ink used in the screen printing process is returned to the can prior to washing the screen. Yes ☐ No ☐

Post-Press

2. A closed still is used to recover and reuse ink cleaning solvents. Yes ☐ No ☐

3. Rinse water from screen reclamation activities is not discharged into the sewer. Yes ☐ No ☐

4. If discharged to sewer, has your facility tested the screen reclamation *rinse water* for BOD, and pH to meet the local Municipal Sewer Discharge By-laws? Yes ☐ No ☐

5. Does your facility filter the *rinse water* from screen reclamation process prior to discharge into the sewer? Yes ☐ No ☐

6. Has *wastewater* from screen printing reclamation activities been tested as required by the local municipal Sewer discharge By-law? Yes ☐ No ☐

   Records of such testing are kept to ensure that the local Municipal Sewer Discharge Limits are not exceeded. Yes ☐ No ☐

Screen Reclamation

7. Reduce the amount of chemicals used in screen reclamation by:
   i. recovering screen cleaning solvents and chemicals for reuse Yes ☐ No ☐
   ii. modifying application techniques Yes ☐ No ☐
   iii. switching to less toxic screen cleaning products Yes ☐ No ☐

Ink Remover (Solvents) (After the excess ink is removed from the screen)

8. Minimize the use of screen cleaning solvents by:
   i. Applying solvent only to the area that requires cleaning. Yes ☐ No ☐
   ii. Using hand held pump bottles to apply ink remover. Yes ☐ No ☐
   iii. Using high pressure screen washers with spray nozzle, paired with brushes to loosen the ink, to reduce the amount of solvent needed for each screen. Yes ☐ No ☐
   iv. Controlling the amount of solvent sprayed by installing a pressure control device for the spray nozzle to prevent the screen reclaimers from pushing the nozzle past a certain release point. Yes ☐ No ☐

3.4 Screen Printing (Pressroom and Postpress) - Checklist

v. Installing a closed system still that utilizes a heating and filtering system to remove pigments. Yes ☐ No ☐

filtered solvent is pumped back for reuse. Yes ☐ No ☐

vi. Installing an automated ink removal system. Yes ☐ No ☐

vii ink-contaminated solvent is properly disposed of as hazardous waste. Yes ☐ No ☐

Emulsion Remover (after ink is removed)

9. Reduce the use of emulsion removing chemicals by:
    i. Applying smaller amount of emulsion remover and increasing the duration of exposure. Yes ☐ No ☐
    ii. Using hand held pump bottles to apply emulsion remover. Yes ☐ No ☐
    iii. Installing a high pressure water blaster (1500 to 4000 psi) with a spray nozzle applicator to remove emulsion. Yes ☐ No ☐
        - Diluting the emulsion removing chemical with water before applying it to the screen (dilution of 1 gallon of remover to 6.5 gallons of water is effective). Yes ☐ No ☐
        - Collecting and reusing the used emulsion remover. Yes ☐ No ☐

Haze Remover

10. Reduce the use of haze removing chemicals by:
    i. Applying haze removal precisely to the part of the screen that is stained. Yes ☐ No ☐
    ii. Using a hand held pump bottles to apply haze remover. Yes ☐ No ☐
    iii. Removing ink and emulsion as quickly as possible. (The longer either material sits on the screen, the more likely it is that haze remover must be applied.) Yes ☐ No ☐
    iv. Applying an ink degradant to the screen before reclamation. Yes ☐ No ☐

Degreasing Process (screen is given a final rinse with fresh water)

11. Used water is collected and stored. Yes ☐ No ☐

12. Used water is then pumped back to be used in the emulsion removal tank. Yes ☐ No ☐

TO DO LIST
Screen Printing

CHECKLIST ITEM #	ACTIVITY	DATE NEEDED	COMPLETE

3.4 Screen Printing (Pressroom and Postpress) - Guidance

Checklist Item Number **Guidance Information**

Pressroom - Postpress

Screen Reclamation

Advantages of screen reclamation:

- saves labour time needed for stretching mesh across the frame and adjusting it to the correct tension.
- save screen fabric costs which can be one of the most expensive supplies that a screen printer uses and can have a large impact on operation cost.
- using retensionable frames when stretching the mesh is believed to "work harden" the fabric, improving the printability and longevity of the screen.
- reusing screens for other jobs, instead of storing them in an imaged screen inventory, saves both screen fabric costs and storage space often needed for presses (US EPA 1994a).

Ink Remover

8. A high-pressure water blast (up to 4,000 psi) has been used to remove ink and loosen the emulsion. The combination of not allowing the ink to dry and using the high-pressure water blast allows workers to flush out both ink and emulsion without the use of ink remover. The waste water is collected, filtered and then reused in removing emulsions. Note: Employees working around high pressure jets should take precautions to protect their ears from the noise generated by the equipment.

Emulsion Remover

9. Special care must be taken to ensure that the emulsion remover does not dry on the screen, as the screen will become almost impossible to clean even with repeated application of the remover (US EPA 1994a).

High pressure water spray can facilitate emulsion removal and may lower the quantity of emulsion remover required. The rinse water can be filtered to remove suspended solids and recycled.

Haze Remover

10. Haze remover can potentially damage the screen mesh, especially the traditional haze removers that are used in the industry. Only use haze remover if it is absolutely necessary.

Minimize the use of petroleum-based solvents in the ink removal process as it frequently stains the mesh requiring haze remover.

Remove ink from the screen as soon as it is possible as haze develops with increase in elapsed time.

Minimize the use of solvent-based ink systems as it produces haze.

3.4 Screen Printing (Pressroom and Postpress) - Guidance

Checklist Item Number **Guidance Information**

Avoid delays in cleaning and reclaiming the screen. The quantity of chemicals needed to remove ink, emulsion, and haze can be reduced if screens are cleaned promptly (US EPA, 1994b).

A screen printer in New York only uses haze remover if it is absolutely necessary. In his printing shop, ink degradant and emulsion remover are spot applied manually, followed by a low pressure rinse and then a final high-pressure water blast which resulted in a 15% reduction in material use. (US EPA, 1994a).

The following information has been extracted from Design for the Environment, EPA 742-F-95-008, July 1996.

High Pressure Screen Washers
High-pressure screen washers reclaim screens using pressurized water, usually in conjunction with some reclamation chemicals. Typically, excess ink is carded off the screen prior to cleaning. No ink remover is applied to the screen. An emulsion softener or remover is applied and allowed to work, usually for 10 seconds to one minute. The ink and stencil are then removed with a high pressure water blaster sprayed on both sides of the screen at pressures of up to 3000 psi. If necessary, a haze remover is then applied and allowed to work. Again, the high pressure water blaster is used to rinse off the haze and the haze remover. Cleaning usually takes place in a washout booth where the rinse water can be collected.

The emulsion and haze removal products were formulated to allow discharge to sewers. Filtration systems can be install to remove ink residues (suspended solids) to meet the local wastewater discharge concentration limits and the filtered rinse water can then be reused reducing water consumption. Filter wastes are typically disposed of as hazardous waste.

This is a very effective and efficient system on screens with solvent-based, water-based or UV-curable inks. Stencil dissolves easily, leaving no emulsion residue. Ink stains on these screens were completely removed by the haze remover even before the waiting period or pressure wash.

Economics:
High pressure washer costs were estimated at US $5,300 (installed) in 1996. The filtration unit ranged in price from US $1,300 to $12,000 in 1996. A cost analysis was conducted in 1996 by US EPA Design for the Environment Program (DFE) Screen Printing Project which estimated the cost of equipment, labor, and chemicals for the high pressure wash and compared it to the cost estimate using

the traditional method. In-this study, the US EPA found that the traditional system cost 30% more than the high pressure wash system, with the greatest savings coming from the reduced labour costs for the high pressure washer.

Automatic Screen Washers
There are several different types of automatic screen washers for ink, emulsion and haze removal. The major benefits of automatic screen washers are reduced solvent losses, reduced labor costs, and reduced worker exposure.

A wash unit, an enclosed box that can house a variety of screen sizes (up to 60 in. by 70 in.), is the basic component of the automatic screen washers. After a screen is clamped inside the wash unit and the top closed, the cleaning process begins. A mobile mechanical arm sprays solvent onto the screen through pressurized nozzles for any preset number of cleaning cycles. Since the systems are enclosed to reduce solvent losses, volatile solvents, such as mineral solvents, are often recommended because of their efficacy. There are, however, a number of alternative formulations offered by equipment manufacturers. Used solvent drains off the screen and is directed to a filtration system to remove particulates (inks and emulsion). Following the filtration steps, reclaimed solvent is typically reused. Some systems have separate wash, rinse, and air dry cycles or separate tanks for washing and rinsing. Solvent reservoirs must be replenished intermittently and changed once or twice a year. Filter wastes are typically disposed of as hazardous waste.

Economics
Costs of these automated equipment varies based on the level of automation (such as conveyors), system capacity, and complexity of the equipment.

Emerging Technologies
Screenprinting Graphics International Association (SGIA) is undertaking a study to determine the environmental impacts from the use of electrostatic and ink jet technologies. Postpress trends include further automation of all finishing operations. Water-based adhesives have been developed for both graphic and textile applications.

3.5 Plant and General Operating Practices - Checklist

Date completed ____________

How your plant is maintained and operated contribute significantly to environmental success. In this subsection, you're asked to examine specific activities, including good housekeeping, that can impact compliance.

Make a copy of this Section to use in your review. Leave the original in the binder.

Plant

1. We collect air compressor blowdown and dispose of it as oily water waste. N/A ☐ Yes ☐ No ☐
2. We have rotary screw air compressors and collect the discharge from the air/water separators as oily water waste. N/A ☐ Yes ☐ No ☐
3. We have water-cooled rotary screw air compressors and separate water from oil if a heat exchanger leaks. N/A ☐ Yes ☐ No ☐
4. Our air conditioner/process chiller contractor is trained in accordance with the requirements of the Nova Scotia Ozone Layer Protection Regulations, or Ozone Depleting Substances Regulations in NB, or Ozone Depleting Substances Act in NF or Ozone Depleting Substances and Replacement Regulations in PEI. N/A ☐ Yes ☐ No ☐
5. Used oil from equipment is collected for recycling. Yes ☐ No ☐
6. Used oil containers and filters are collected for recycling. Yes ☐ No ☐
7. We use a soap for general cleaning, rather than solvents in order to reduce our environmental impact. Yes ☐ No ☐

Energy and Water Conservation

8. Good housekeeping is monitored throughout the facility. The condition is as follows: (Whenever an area is *not* satisfactory, use the housekeeping form in Appendix 15 to identify the issue, what needs to be done, who will do it and by what date.)

   We conserve energy by:

   i. reducing heat to stairwells, hallways and lobbys. Yes ☐ No ☐
   ii. reducing thermostat settings at night, weekends, and holidays. Yes ☐ No ☐
   iii. installing energy efficient lighting throughout work areas. Yes ☐ No ☐
   iv. turn off lights and office equipment when not in use (i.e., overnight or weekends) Yes ☐ No ☐

3.5 Plant and General Operating Practices- Checklist

v. purchase products that have low energy use ratings and automatic power-save or sleep modes (i.e. products with the Canadian EcoLogo symbol or US EPA Energy Star Logo). Yes ☐ No ☐

9 We conserve water by:

i. repairing leaking pipes, hoses, fittings and faucets immediately. Yes ☐ No ☐
ii. not allowing hoses to run continuously. Yes ☐ No ☐
iii. installing water saving devices and timers on workplace taps, showers, and toilets. Yes ☐ No ☐

Area	*Check if satisfactory*
Office	☐
Prepress	☐
Pressroom	☐
Finishing	☐
Storage/warehouse	☐
Chemical storage	☐
Maintenance	☐
Grounds	☐
Other ____________________	☐
____________________	☐
____________________	☐

Appearance	*Check if satisfactory*
Loading docks are clean and free of stains that may indicate a past spill.	☐
Production area sinks are free of stains that may indicate solutions other than water have been discharged.	☐
The areas around sinks and wash-up locations are free of stains.	☐
Oil dry absorbent is swept-up and disposed of regularly.	☐
The plant is painted, windows cleaned, and flat surfaces are free of dust and clutter.	☐

Solvent Management

10. Solvents are managed to minimize human health and environmental risks by using the following procedures:

Procedure	*Check if used*	*If not checked, explain why not*
Solvents are stored, managed, distributed and ordered from a central location within the plant.	☐	____________________

3.5 Plant and General Operating Practices- Checklist

10. (Cont.)

Procedure	*Check if used*	*If not checked, explain why not*
The plant has a chemical management policy to evaluate all purchase requests and to determine if they are required and if less hazardous alternatives exist.	☐	
Chemical inventories are minimized by choosing multipurpose solvents over single use products.	☐	
Solvents are selected by reviewing the MSDS and other product information to select the most effective solvents that pose the least risk to the health of employees or the environment.	☐	
The plant has a VOC reduction program.	☐	
Staff are encouraged to find practical ways to reduce VOC emissions and replace high VOC products with less hazardous alternatives.	☐	
Alternatives are found for the most hazardous solvents such as toluene, MEK and xylene.	☐	
Purchase orders include a statement indicating that an MSDS must be provided with the first shipment of all WHMIS control products.	☐	
All chemicals are labelled with the date received.	☐	
Sufficient supplies of spill containment and clean up materials are available on site.	☐	

Developing An In-house Pollution Prevention Program

11. The best pollution prevention programs are built with the help and support of plant employees. The following procedures are used to facilitate employee input:

3.5 Plant and General Operating Practices- Checklist

Procedure	*Check if used*	*If not checked, explain why not*
The concept of pollution prevention is discussed with employees and they are encouraged to help set targets and goals for an in-house pollution prevention program.	☐	
Key employees are encouraged to audit practices and look for ways to improve the operation.	☐	
Staff are encouraged to come up with solutions that save resources (energy, water, raw materials), reduce waste at source and reduce or eliminate hazardous process chemicals.	☐	

Customer Relations

12. Customers can play a large part in a companies pollution prevention initiative. The following procedures are used to promote pollution prevention to customers:

Procedure	*Check if used*	*If not checked, explain why not*
Posters are placed in the waiting area to inform customers about the companies pollution prevention initiatives.	☐	
Customers are encouraged to select green printing methods where appropriate.	☐	
Customers are offered discounts and incentives to encourage the use of existing ink inventory, re-blended stock and paper that may be left over from other jobs.	☐	

13. Now that you have worked through this subsection, review your answers. For every item that you answered *No*, list follow-up activities on the TO DO LIST on the following page. These are activities that you *must* do in order to answer *Yes* to the item.

If you need more information in order to respond to a statement on the checklist, refer to the Guidance Section, beginning on page 3-42. The number of the statement in the checklist corresponds to the number of the explanation in the Guidance Section.

Consider this subsection complete when you're able to provide all the information requested, answer *Yes* to all the items or provide a rationale for a *No* answer. Store the completed document in your environmental file.

TO DO LIST

Plant

CHECKLIST ITEM #	ACTIVITY	DATE NEEDED	COMPLETE

3.5 Plant and General Operating Practices - Guidance

Checklist Item Number — **Guidance Information**

1. **Plant Maintenance**
All piston and rotary compressors impart oil into the compressed air stream. This oil ends up in suspension with the humidity that is squeezed from the air when the air is compressed. The blowdown from the air receiver tank becomes a white liquid that is considered a liquid industrial waste. Many plants have a drain line from the compressors that runs out the back door. Those plants will have an oily stain running off into the back yard that is considered to be soil contamination.

3. **Air Compressors**
Water-cooled rotary screw compressors use a tube-type heat exchanger to cool the oil from the compressor with cooling water. Should a tube split, the oil from the compressor will be pumped into the water stream. The compressor usually holds many litres of oil and this situation can go on for many days before the compressor shuts down on low oil pressure. Oil in a chilled water system can damage the heat exchangers in other equipment. Oil in a storm sewer or sanitary sewer will put the plant out of compliance.

Check the compressor oil daily. If the cooling water is discharged to a storm sewer a floatation tank should be installed to separate the oil from the water before discharge. An old air receiver tank can be used for this application. Consult your plumber for a way to do this. There are filters available that will let water pass, but will trap oil and solvent.

4. **Licensed Contractor**
Nova Scotia Ozone Layer Protection Regulations and Ozone Depleting Substance Regulations & Acts (NB, NF & PEI) controls the use of refrigerants that are CFCs or HCFCs and the fire suppression agent Halon. Under these regulations all tradespeople who work on refrigeration systems, or fire suppression systems that use Halon must be trained. These service people should keep a record of all of the service work they do on your equipment and leave a copy with your company. In addition, certain non-essential uses of ozone depleting substances are prohibited, for example, the use of CFCs, HCFCs and carbon tetra chloride as a solvent. In New Brunswick, contact the Industrial Approvals Section of NBDOE at (506) 457-4848.

If you have a refrigeration or fire suppression system that leaks more than 25 kilograms of an ozone depleting substance (CFCs, HCFCs, halons, carbon tetra chloride and methyl chloroform) to the environment, you are responsible for reporting that release to Department of Environment at 1-800-565-1633.

6. **Used Oil Containers and Filters**
A single litre of used oil has the potential to contaminate one million litres of drinking water. In addition, millions of used oil containers and used oil filters are now discarded to landfills.

3.5 Plant and General Operating Practices - Guidance

Checklist Item Number **Guidance Information**

Nova Scotia's Used Oil Regulations are designed to improve the recovery of used lubricating products and supports the establishment of a province-wide program to improve access to collection facilities. An industry-operated program, promotes and facilitates the cost-effective collection and disposal of used oil in Nova Scotia. In New Brunswick and Newfoundland, Used Oil Control Regulations are proposed. This regulation facilitates the responsible use, storage and disposal of used oil in the provinces. Industry managed cradle-to-grave program for used oil is promoted.

For information about where you can recycle oil filters and containers contact any of the following:

NS:
Barry Friesen
Solid Waste Resource Manager
Nova Scotia Department of Environment
Box 2107
Halifax, Nova Scotia B3J 3B7
Phone: (902) 424-2645

Resource Recovery Fund Board Inc.
231 Lancaster Crescent
P.O. Box 99
Debert, Nova Scotia B0M 1G0
Phone: 1-800-665-LESS (5377)
Fax: (902) 662-2396
Web: http://www.rrfb.com

Clean Nova Scotia and Nova Scotia Materials Exchange
PO Box 2528 Central
Halifax, Nova Scotia B3J 3N5
Tel: (902) 420-3467
Fax: (902) 424-5334
Clean Nova Scotia Web: http://www.clean.ns.ca
Materials Exchange Web: http://www.clean.ns.ca/materials_exchange/wxh.htm

NB: Used Oil Regulation is currently under development in NB, collectors, transporters and recyclers of used oil must have an approval to operate under the Water Quality Regulations. For further information, contact the Technical Approvals Section of NBDOE at (506) 453-7945.

3.5 Plant and General Operating Practices - Guidance

Checklist Item Number	Guidance Information
NF:	Toby Matthews Waste Management Section Pollution Prevention Division NFDOE and Labour (709) 729-5793
PEI:	Darin MacKinnon Solid Waste Reuse, Recycling and Composting (902) 368-6664
	Kevin Curley Solid Waste Resource Management (902) 368-5038
8.	**Good Housekeeping** Wasted time and motion is a large part of lost profits. It also leads to increased risk of spills and accident. You can note any poor housekeeping issues on Appendix 15. Ask someone who is not normally in your plant, to take a tour and assess your housekeeping. Their response will give you a good idea of what an inspector might see.
10.	**Solvent Management** The in plant storage and handling of solvents and other dangerous good used in the printing process are regulated by: Plant employees must be provided with appropriate safety and personal protective equipment and be trained in the safe use of all chemicals that are used in the plant. It is advisable to have and post an emergency response plan to provide guidance on dealing with any chemical spills that may occur in the plant. Spills which are contained inside the plant do not have to be reported. Depending of the volume, spills of solvents and other hazardous chemicals to the outside environment (i.e. in a parking lot or loading area) must be reported. Ensure the Environmental Emergency Reporting number 1-800-565-1633 (Atlantic Canada) is posted near phones at loading docks and other areas where a spill may occur.
NS:	Department of Labour (WHMIS Regulations under Occupational Health and Safety Act) and Department of the Environment (Dangerous Goods Management Regulations). Contact 1-800-952-2687 for further information or fax your inquiries to (902) 424-3239.
NB:	Workplace, Health, Safety and Compensation Commission of NB (WHMIS Regulations under the Occupational Health and Safety Act). Contact Wilma Lewis at (506) 453-3750 for further information.

3.5 Plant and General Operating Practices - Guidance

Checklist Item Number	Guidance Information
NF:	Department of Environment and Labour (WHMIS Regulations under the Occupational Health and Safety Act). Report workplace accidents to 1-800-563-5471 in Newfoundland.
PEI:	Workers Compensation Board (WHMIS Regulations under Occupational Health and Safety Act). Contact (902) 368-5680 for further information.
12.	**Customer Relations** Work with your customers to encourage them to select green printing methods where appropriate. For example, train your sales staff to be enable them to discuss available choices with customers. Advise your customers that you offer recycled paper and vegetable oil based inks. Suggest alternatives to adhesives and coatings that can interfere with the recyclability of the finished product. Work with customers to layout print jobs to minimize trim waste. A short bulletin can be developed to advise customers of the choices that are available to them and help them to develop "green" printing specifications for their work. A sample bulletin that you can reproduce on your company stationary is available from the Pollution Prevention Section of Nova Scotia Department of the Environment at (902) 424-5300.

3.6 Property - Checklist

Date completed ____________

You can learn a lot about your property by walking around the site looking for environmental hazards and opportunities for pollution prevention. It's also important to find out who your neighbours are and what they do because their operations could have an environmental impact on your business.

Make a copy of this Section to use in your review. Leave the original in the binder.

The Building

1. The size of the building is __________ m² and the property is __________ m².
2. The building was constructed in _____.
3. It was expanded in the following years:

Year	*Describe the expansion*
_____	____________________________________
_____	____________________________________
_____	____________________________________

4. The building is (check one) owned ☐ leased ☐
5. The number of people employed here is _______.
6. The number of shifts worked here is ________.
7. Our hours of operation are: Monday - Friday _______, Saturday _______, Sunday _________.
8. All the utilities used at this site are checked below and the cost per year is estimated.

Utility	*Check if used*	*Cost this year*	*Cost last year*
Gas	☐	____________________	____________________
Propane	☐	____________________	____________________
Water	☐	____________________	____________________
Sewer	☐	____________________	____________________
Electricity	☐	____________________	____________________
Totals		____________________	____________________

3.6 Property - Checklist

9. All the wastes generated at this site are checked below and the cost per year is estimated.

Waste	*Check if used*	*Cost this year*	*Cost last year*
Solid waste disposal (not including recycled wastes)	☐		
Solid waste removal (only waste sent for recycling)	☐		
Liquid industrial waste removal	☐		
Hazardous waste removal	☐		
Total annual cost			

10. In our environmental file, we maintain a current and complete list of people responsible (see Appendix 12). Yes ☐ No ☐

The Property

11. I have walked the property on which my business is located and I have seen the following:

   i. The ground is free of visible signs of staining. Yes ☐ No ☐

   ii. The ground is free of patches of dead or dying vegetation. Yes ☐ No ☐

   iii. The outside areas are free of containers including pails, barrels, tote tanks or aboveground storage tanks. Yes ☐ No ☐

   iv. Where there are outside storage containers, they are:

Free of any evidence of leaking	N/A ☐	Yes ☐	No ☐
Protected with spill containment	N/A ☐	Yes ☐	No ☐
Organized for chemical compatibility	N/A ☐	Yes ☐	No ☐
Have vehicle protection barriers	N/A ☐	Yes ☐	No ☐
Located away from storm/sanitary sewer manholes	N/A ☐	Yes ☐	No ☐
Protected from the elements	N/A ☐	Yes ☐	No ☐
Clearly labeled to reveal their contents	N/A ☐	Yes ☐	No ☐
Stored in a fenced or secure area	N/A ☐	Yes ☐	No ☐

   v. The grounds are free of clutter and debris. Yes ☐ No ☐

12. I have checked the adjacent properties and found that liquids stored outside are stored in an environmentally-safe manner. N/A ☐ Yes ☐ No ☐

   i. I have documented and included in the environmental file any concerns I have about the uses or status of neighbouring properties. (Additional forms are included in Appendix 4.) Yes ☐ No ☐

3.6 Property - Checklist

ii. The adjacent properties are used for the following:

To the north ______________________________

To the south ______________________________

To the east ______________________________

To the west ______________________________

iii. The distances from my fence line to the buildings on the adjacent properties are:

To the north______________ To the south______________

To the east ______________ To the west ______________

iv. The prevailing wind direction is ______________.

v. The distance to the closest *residence* in each direction is:

To the north ______________________________

To the south ______________________________

To the east ______________________________

To the west ______________________________

vi. The nearest natural bodies of water are listed below:

Name of watercourse	*Direction*	*Distance*

vii. The known ground water uses within 5 km of my facility are*

To the north ______________________________

To the south ______________________________

To the east ______________________________

To the west ______________________________

* note if there are wells used for drinking or livestock

3.6 Property - Checklist

Environmental History

13. Any environmental concerns based on past use have been documented and included in the environmental file.

N/A ☐ Yes ☐ No ☐

As the current tenant of your building, you need to know what has happened in the past. Find out what the building and property have been used for in the past and whether there have been any reported or unreported spills to the outside environment.

14. Any previous environmental audit or assessment done on this site has been documented and included in the environmental file. (An example of a Standard Environmental Checklist is included in Appendix 6.) N/A ☐ Yes ☐ No ☐

15. The building and property have been owned by the following:

Dates *Name of owner(s)*

_____ to current _______________________________

_____ to _____ _______________________________

_____ to _____ _______________________________

16. In addition to printing, this building and property have been used for the following purposes:

Dates *Purpose or type of business*

_____ to _____ _______________________________________

_____ to _____ _______________________________________

_____ to _____ _______________________________________

17. We know about and have documentation of past spills or environmental problems that have occurred on this site. N/A ☐ Yes ☐ No ☐

i. We have contacted the following for records of past problems or spills: (document all telephone and personal conversations)

NS: Environmental Registry Coordinator (1-901-424-2549) Yes ☐ No ☐

NB: Regional Services Section of NBDOE (1-506-457-4850) Yes ☐ No ☐

NF: Government Services Centres Yes ☐ No ☐
East Coast (1-709-729-3699)
East Coast (1-709-466-4070)
West Coast (1-709-637-2204)

PEI: Technology and Environment, Environmental Protection Yes ☐ No ☐
Danny McInnis at (902) 368-5057.

Environment Canada office (See Appendix 1) Yes ☐ No ☐

Municipal sewer authority (see Appendix 1) Yes ☐ No ☐

Local public utilities commission Yes ☐ No ☐

Long-term employees and retirees Yes ☐ No ☐

3.6 Property - Checklist

ii. Where contamination was cleaned up by contractors,their report is included in the environmental file.

N/A ☐ Yes ☐ No ☐

Storage tanks that are not maintained properly can leak and contaminate soil and groundwater. To protect against an environmental incident, learn the history and current status of any storage tanks on your site.

Storage Tanks

18. Our history and current status of using underground storage tanks (USTs) is documented below. (If no USTs have ever been used on your property, skip to item 19.)

NS: Contact Department of the Environment to confirm whether USTs have ever been used on your property at 902-424-5300.

NB: Above ground and underground petroleum storage tanks are regulated in NB under the "Petroleum Product Storage and Handling Regulation" under the Clean Environment Act. For further information, contact the Industrial Approvals Section of NBDOE (1-506-457-4848).

NF: In Newfoundland, checklist of underground storage tanks exist as part of the regular permitting protocol under the "Gasoline and Associated Products Regulations".
Contact Government Services Centres: East Coast (1-709-729-3699 OR 466-4070),
West Coast (1-709-637-2204)

PEI: Petroleum storage tanks are handled by the "Petroleum Storage Tanks Regulations".
Contact Danny McInnis at (902) 368-5057.

i. For every UST that *was used but has been removed*, provide the following information:

Date installed	*Date removed*	*Description of the contents*
______	______	____________________________________
______	______	____________________________________
______	______	____________________________________
______	______	____________________________________

ii. For every UST that *is still in place*, provide the following information:

Date installed	*Date inspected*	*Description of the contents*
______	______	____________________________________
______	______	____________________________________
______	______	____________________________________
______	______	____________________________________

3.6 Property - Checklist

19. Our history and current status of using aboveground storage tanks (ASTs) is documented below. (If no ASTs have ever been used on your property, skip to item 20.)

    i. For every AST that *was used but has been removed*, provide the following information:

Date installed	*Date removed*	*Description of the contents*
____	____	____________________
____	____	____________________
____	____	____________________
____	____	____________________

    ii. For every AST that *is still in place*, provide the following information:

Date installed	*Date removed*	*Description of the contents*
____	____	____________________
____	____	____________________
____	____	____________________
____	____	____________________

20. All storage tanks — underground and aboveground — have been inspected for leaks. N/A ☐ Yes ☐ No ☐

21. All storage tanks meet local, provincial and federal requirements. N/A ☐ Yes ☐ No ☐

22. Where storage tanks were removed by contractors, their report is included in the environmental file. N/A ☐ Yes ☐ No ☐

23. A complete written tank inventory is in the environmental file. (See Appendix 2.) N/A ☐ Yes ☐ No ☐

24. Now that you have worked through this entire Section, review your answers. For every item that you answered *No*, list follow-up activities on the TO DO LIST on the next page. These are activities that you must do in order to answer *Yes* to the item.

    For example, if you answered *No* to the item "We have contacted the local Department of Environment for records of past problems or spills," then you should make a note on the TO DO LIST about calling the province for information.

    If you need more information in order to respond to a statement on the checklist, refer to the Guidance Section, beginning on page 3-55. The number of the statement in the checklist corresponds to the number of the explanation in the Guidance Section.

Consider this subsection complete when you're able to provide all the information requested, answer *Yes* to all the items or provide a rationale for a *No* answer. Store the completed document in your environmental file.

TO DO LIST

Property

CHECKLIST ITEM #	ACTIVITY	DATE NEEDED	COMPLETE

3.6 Property - Guidance

Checklist Item Number **Guidance Information**

---

4. **The Building**

If the building is ***owned,*** expect to be asked for an environmental site assessment before you can sell your property or use it as collateral at the bank. An environmental site assessment will be much less expensive if you have completed the Checklists, and thus, have an environmental management system (EMS) in place. All of your files will be in one place, your site will be well organized, your employees will be knowledgeable, and your facility will be in compliance.

If the building is ***leased,*** you may have some issues to resolve with the landlord. These may include the following:

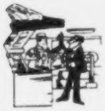
- What environmental impact do the other tenants have on your business and the leased site? If they spill something can you prove it wasn't you, and keep from paying some of the cleanup bill?

- Do you need the landlord's approval to make changes?

- Should you have your lease reviewed to see what your environmental responsibility is under the lease contract? If you find things that trouble you, consider having the lease revised.

- Will the landlord review the site with you after you've completed the Checklists? Will he/she put in writing that there are no issues you will be held responsible for when the lease expires? Do this while you are a valued tenant, rather than after you have vacated.

5., 6., 7. **Employees**



This information is used to decide your training needs. Multi-shift plants need to coordinate environmental events on all shifts. If you operate a multi-shift plant, try the following test. Call during the second or third shift and ask whoever answers the phone what they would do if you were calling to report a spill in the parking lot. You may be surprised and a little disturbed by the answers you receive. Make sure **all** employees receive the training they need.

8. **Utilities**

Managing your utility bill is one of the easiest ways to reduce your operating costs. By estimating the amount you're currently spending for utilities, you'll get an idea of the potential cost savings possible through energy reduction projects. Likewise, by looking at your waste disposal bill you can see the potential savings through pollution prevention.

The utility bill is a great money leak. It is a worthwhile exercise to estimate how much is spent on electricity, heating fuel (oil or natural gas), water and sewer and

3.6 Property - Guidance

Checklist Item Number **Guidance Information**

arrive at a yearly total. Divide this by the total sales of the company less the paper you bought (this number is your value added plus profit).

annual sales - paper cost = value added

utility bill ÷ value added x 100 = ___%

This simple percentage will probably surprise you, for most companies don't control their utility bill; they just pay it.

Energy
To reduce your utility costs you can do the following:

- Come in after hours and look for anything that uses power that does not need to be on (e.g., lights, pumps, air compressors, vacuum pumps, air conditioners, heaters, etc.).
- Put in procedures and assign responsibility to be sure that the building and equipment is properly shut down after hours.
- Fix every air leak and stop using compressed air wherever you can. It is the most expensive utility that you have.
- Heat or cool only those areas that need it.
- Review your lighting and have a competent person look at how much electricity you could save by changing it or reducing it.
- Use motion detectors to turn lights on and off wherever possible. These can now be refitted in place of light switches.
- Install set-back thermostats.
- If you rent your manufacturing space, be sure that only your equipment and area is charged to your bill. Some of the circuits from other tenants may be on your meter.
- Look at every place where water is used in the plant and find a way to reduce it.
- Measure your utility cost against last year, against pounds of product produced, and against any other benchmarks you can find. Include in this benchmarking any opportunity to ask other printers what their utility bill is.

9. **Solid Wastes**

Information on solid waste can be obtained from:

NS:	Resource Recovery Fund Board Inc. Tel: 1-800-665-LESS (5377)
NB:	Municipal Services, Solid Waste Section Tel: (506) 444-4599
NF:	Waste Management Tel: (709) 729-6664
PEI:	Solid Waste Reuse, Recycling and Composting Tel: (902) 368-6664

3.6 Property - Guidance

Checklist Item Number | **Guidance Information**

11.i., 11.ii.

The Property
Visible staining on the ground and patches of dead or dying vegetation are symptoms of contaminated soil. Previous spills, leaking underground tanks or pipelines, buried liquid waste or contaminated soil brought in as fill from another site could be involved.

Soil Contamination
Many industrial sites have areas of soil or gravel where chemicals have been spilled in the past. This is not always a difficult issue to resolve. If the soil is stained, but has no odour of hydrocarbons (gas or oil) and still supports vegetation, it can be covered with fresh earth.

If you can smell hydrocarbons, you should send a soil sample to an analytical lab to determine the parts per million (ppm) of the contamination. Most local landfills will accept soil with low levels of contamination. A call to your local landfill will confirm this. Expect them to ask for the analytical test results of the soil before they will accept it at the landfill.

11.iii., 11.iv.

Outside Storage
Pails, barrels, tote tanks or aboveground storage tanks around the outside of the building all increase the risk of an environmental problem. If liquids must be stored outside of the building, the tanks or containers must have some form of spill containment.

Spill containment can take the form of:
- double-walled tanks,
- secondary containment tanks plumbed to sanitary sewer drains, or
- bermed areas.

Storing chemicals outside is a bad practice, unless they are stored in dedicated tanks having their own secondary containment. Double-walled tanks and tanks with built-in covered berms fall in to this category. They must be in a protected area or protected with bollards to prevent damage by vehicles. Overflow pipes must be plumbed to catch tanks. The plumbing to the tank must also be protected from damage. The fill valves should be locked so that suppliers can only fill the tank when your personnel are present.

Open berms have two drawbacks:
- Rain water collects in them, resulting in either drains left open, or berms full of water. If you are storing solvents or other fluids lighter than water, the leaking fluid floats out of the berm with the rain overflow.

- Berms can fail either from poor design or lack of inspection and maintenance.

3.6 Property - Guidance

Checklist Item Number	Guidance Information
11.v.	**Clutter and Debris** The grounds should be free of clutter, debris and disorganized storage. A government inspector will pay particular attention to this as housekeeping is the first and most visible step towards gaining control of your site.
12.	**Neighbouring Properties** A spill by your neighbour can decrease your property value to zero or below, and you may have no financial recourse to collect damages. It is far better to identify potential problems before they result in a spill on your property. Your neighbours should welcome your comments. It is not in their best interest to ignore you. If they are tenants, call their landlord for the information.
12.iv.	**Wind Direction** Information on prevailing wind direction will be key when it comes time to organize an odour patrol.
12.vii.	**Groundwater** A spill on your property can be a serious event with long term ramifications. A spill into a natural body of water is even more serious, and can result in charges both to the company and to the individuals, and may involve massive clean-up bills. Spills into groundwater have resulted in orders from the government for a company to truck water to an entire community. This is why so much emphasis is placed on eliminating outside storage of chemicals where possible and utilizing just-in-time delivery of tote tanks etc. Where chemical storage is necessary the emphasis must be on proper storage, containment and routine inspections. The federal government becomes involved if you spill into a fish habitat. This does not have to be a direct spill. If your storm sewer exits into a lake or bay, this may affect you.
13., 14.	**Environmental History** There is new Environmental Auditor accreditation through the Canadian Environmental Auditing Association. For accredited consultants in your area call the CEAA at (905) 567-4705. Their Internet site is <http://www.mgmt14k.com/ceaa>.
15., 16.	**Building History** The past owners of the building will be a valuable source of information concerning the building history and the site history. They will also give you an insight into the past uses of the building and property.
17.	**Spills** A spill is defined in the Environment Act as a release into the environment. By this definition, a spill inside your plant is not considered an environmental problem unless it escapes your building.

3.6 Property - Guidance

Checklist Item Number	Guidance Information

Past spills are of interest for two reasons:

- You may or may not be responsible for the after-effects of a spill. The more you learn about it, the stronger your position will be if problems such as groundwater contamination are traced to your site.

- Records of a clean-up may be key to selling the property. The sooner you build a history, the more accurate it will be. Many contractors got in and out of the environmental clean-up business in the late 1980s and early 1990s. If their records are lost, you may have to recreate them — a very expensive exercise.

Any information you discover can be kept confidential. It is *not* a matter of public knowledge.

18. **Underground Storage Tanks (USTs)**
Abandoned USTs are difficult to control. They usually lie ignored and many have been forgotten. Most were installed in the 1950s and 1960s and are past their life span of 25 years. Leaks are only discovered after groundwater has been poisoned or vapours detected. It's common to find a UST that's still partially full after years of disuse. How full it was when abandoned is a frightening question as one part of gasoline or fuel oil to a million parts of water make the groundwater unfit for human use. It has been estimated that Canada has up 10,000 leaking USTs.

The evidence of abandoned USTs is usually filler or vent pipes next to the building. Other clues come from the original building plans, older employees, a conversion in the past from fuel oil to natural gas for space heating, and a history of past uses of the building that includes chemical use in bulk quantities.

Underground storage tanks are only controlled by law if they contain gasoline. Yet the landowner is responsible for *any* leak into the natural environment. ***This is a good example of where complying with the law doesn't provide adequate protection against being charged with an environmental offense.***

If you find a tank that is abandoned, call your local service station and ask who services their pumps and tanks. That contractor will know who is licensed and capable of removing underground tanks.

If you have a UST, seriously consider whether you really need it. Think about replacing it with an aboveground tank with suitable containment, where it can be easily inspected and removed when it is no longer required.

Checklist Item Number	Guidance Information
	As alternatives to storage tanks, consider product substitution, just-in-time delivery of chemical in reusable totes, or in the case of isopropyl alcohol (IPA), discontinuing its use.
19.	**Aboveground Storage Tanks (ASTs)** Aboveground storage tanks are now the choice of anyone needing to store bulk liquids. While underground storage tanks are difficult to test and almost impossible to adequately inspect, aboveground tanks and piping can be checked with a walk around.

There are three considerations when installing above ground tanks:
1) Do you really need the tank? If the tank is used for storing waste liquids, ask your waste hauler for the price of waste in 45 gallon drums. If you are buying liquid in bulk, see if the supplier can meet the price and deliver in returnable totes instead?

2) What will be stored in the tank and where will it be placed? If the liquid is flammable, then secondary containment and grounding requirements are spelled out in either the *National Fire Code of Canada*. We've included the hard-to-find containment tank criteria in Appendix 16.

If the tank is in a room with secondary containment, such as a dike, a dropped floor, or a floor drain connected to a holding tank, then a single-walled tank is sufficient. A dike around all of your chemical storage area is good insurance. Be sure the dike area will hold 50 percent more liquid than is contained in the largest tank in the area. If you use an existing cast cement or cement block wall, be sure that it is liquid tight. All areas where chemicals are stored should have painted floors and walls. This ensures that spills are cleaned-up and helps liquid-proof dikes and walls.

If secondary containment is required and not already in place, a double-walled tank may be a good option. This is a tank inside a tank. The manufacturer puts a slight vacuum in the space between the tanks and installs a pressure sensitive alarm on the tank. If the tank is damaged and the vacuum seal is lost, an alarm sounds.

Make sure that someone from your company monitors what is pumped into the tank, and that the tank is not over filled. It is also a good idea to pipe the overflow into a small tank or barrel to avoid spillage. A high-level alarm provides additional protection. If the tank is filled from outside, be sure the fill port is locked.
If the liquid is from your plant and destined for a waste hauler, how do your employees get the liquid to the tank?

3.6 Property - Guidance

Checklist Item Number **Guidance Information**

3) Is the tank or storage area protected from damage? Tanks placed outside should be protected against damage from vehicles. In one instance, the truck that was coming to pick-up the liquid waste stored in the tank, backed over the tank. Tanks, drums or totes stored inside the building should be protected from fork trucks. They should also be located away from the loading dock or placed in such a way that spillage does not exit the building.

Tanks to be placed outside may require local approval. If the tank will be used to store flammable liquid, you must call your fire department. The local municipal building code office will give you information regarding set-backs from property lines or other municipal requirements. If the tank will store motor vehicle fuel, then the Petroleum Act comes into play. Contact the supplier of the tank or of the fuel for more information.

The following publications are available from Nova Scotia Department of Environment Tel: (902) 424-5300 and New Brunswick Department of Environment Tel: (506) 453-2851.

- Nova Scotia Standard for Construction and Installation of Petroleum Storage Tank Systems
- A Home Owners Guide to Oil Tank Safety (NS)
- Petroleum Product Storage and Handling Regulations - Clean Environment Act (NB)
- Construction Standards for Installation and Removal of Petroleum Storage Systems (NB)

EMS

Section 4: Systems for Pollution Prevention and Compliance

Introduction

In Section 4 we introduce you to environmental management systems for ensuring that the environmental concerns of your business will never be an unpleasant surprise. An environmental management system or EMS is an organized way to control information, to initiate the proper action called for in a specific situation, and to meet your regulatory requirements. Precisely how your EMS will look depends on the size of your business, with regard to both risk and the resources you can put to the task of minimizing your risk and maximizing profit.

Table of Contents - Section 4

4.1 Small-Sized Business 4-4
4.2 Medium-Sized Business 4-5
4.3 Large-Sized Business 4-19

Notes

Matching the EMS to the Business

If you're a small business owner, you're probably saying, "The last thing I need is another system." But in Section 4 we introduce three variations of an EMS: one for a small-size business, one for a medium-size business and one for a large-size business.

In Section 1 of this pollution prevention guide, we said that an EMS can do three things: prevent an environmental incident, keep an environmental incident from getting worse, and show that your company took all reasonable care to prevent the environmental incident (due diligence).

According to *Environmental Management in Canada*, a recent publication by McGraw Hill Ryerson, "It is clear that some form of environmental management system is a minimum requirement for due diligence in the courts, and more importantly that it is possible for a corporation to defend itself from charges resulting from a spill or environmental incident by establishing a successful defense of due diligence aided by its EMS." To sum this up in one sentence: **Every company, regardless of its size, needs to have an environmental management system.**

The three systems outlined in this Section are tailored to the size of your company so that small business is not overwhelmed, and large business has the appropriate level of control and continuity.

Small-Sized Business

In a small company the environmental role will fall to one knowledgeable person — an owner, a manager or a designated employee who is involved in the printing process on the shop floor. This person will be responsible for the environmental file including all necessary reports and documentation. This is also the person who will get the call if an inspector has reason to contact the company. With one person covering almost all of the environmental bases, the system can and should be very simple. For the small company, we recommend a checklist-based system to help the responsible individual ensure that things are getting done when they should, and that nothing in the operation is changed without considering the impact on the company's environmental performance.

Medium-Sized Business

In a company where different employees handle chemical purchasing, solvent disposal, new equipment and spill response, or where there is greater employee turnover resulting in changing responsibilities, a different system is required. In this case a company needs a system to make sure everyone knows their role, and all the roles are being filled.

For the medium-sized organization, a policy-based system allows for control when more than one person has responsibilities that can impact the environment.

Large-Sized Business

Large-sized companies need a system that helps them look continuously at the impact that their operations have on the environment and strives to minimize them. For these companies, a very comprehensive system is required that can be monitored off-site, is verifiable by large shareholders and customers, and has the ability to withstand the scrutiny of global markets. For large organization, we introduce you to an ISO 14001 environmental management system.

In this Section we will discuss each of these three approaches. We recommend that you read about all three types of EMSs to help you decide which system is best for your printing company. And make sure to read the policy on inspections by the government.

Scrutiny by the Media

One final note before we move to environmental management systems: if your company has an environmental incident such as a spill, your operations may well come under scrutiny by the media. In the next column, we've provided you with tips for dealing with the media and for participating in an interview. We recommend that you make copies of this page and give one to every person in your company who is designated as a spokesperson.

When you're dealing with the media remember the following points:*

1. The media is after a good story.

2. A good story is one that has both conflict and simplicity.

3. Reporters do not like extreme views that do not seem credible.

4. Reporters do not like views that are middle of the road and do not hold people's interest.

5. You can choose between "no comment" and the chance to tell your side of the story.

6. If you can educate the reporter, they can write a better, more accurate story

7. Check continuously to make sure the reporter understands what you are saying.

8. Reporters are always pressed for time. Do not expect them to do any research on what you are saying after the fact. Give them the details and the understanding, or get back to them with more information. They will not generally come back to you for clarification.

Basic Interview Tips

As for the interview itself, here are some tried and true guidelines:

- Keep your message simple and use examples.
- State your most significant points up front and continue to stress them.
- Speak in the first person if appropriate; it strengthens credibility.
- Always tell the truth. Admit wrong when you know it exists and explain why it is wrong.
- Admit it when you don't know something. Offer to find out if you can.
- Avoid argument. Remain courteous and positive.
- Do not be led from your message.
- Do not repeat insulting or leading questions. Acknowledge them but steer the interview back to your own points.
- Listen carefully to questions and responses to your answers.
- Ask if the reporter understands specific parts of what you are saying.

9. Always make the offer to check over the story after it is written and before it is published. Reporters don't like to look foolish by getting the jargon or the story wrong, and if they have time and are good at what they do they will accept your offer.

---

* Adapted from: *Going Green: How To Communicate Your Company's Environmental Commitment*, E. Bruce Harrison, Business One, Homewood, IL 60430. (ISBN 1-55623-945-9)

4.1 Small-Sized Business: A Checklist-Based System

Now that you've completed the checklists in Section 3, you have a good feel for the purpose and the usefulness of checklists. They organize your questions, your approach and your efforts — a simple but excellent tool for staying on top of environmental concerns. We know checklists work; think about all the competent, experienced, professional pilots who do everything by checklist every time, no matter how many thousands of hours they have flown the same aircraft.

And now for the good news. After you have completed the to-dos you listed while working through the checklists and you've answered either "yes" or "N/A" to every checklist statement, Section 3 of this pollution prevention guide becomes your EMS with the addition of just two more sheets of paper:

- Appendix 17 - a monthly inspection checklist focusing on housekeeping, appearance and spill kit inspections, and

- Appendix 18 - a semi-annual inspection checklist that focuses on hazardous waste shipping manifests and any changes to employees, equipment, processes and neighbours.

These three things — Section 3 checklists, Appendix 17, Appendix 18 — make up your small-business environmental management system.

Environmental Policy

If your company wants to make a formal commitment to improving its environmental performance, consider writing an environmental policy. There's information about environmental policies on page 4-6.

Tracking Environmental Performance

At the end of the first year of your EMS, make copies of all the blank checklists in this guide and undertake another evaluation of your business. Then compare the answers to the first time you completed the checklists to see whether your company's environmental performance has improved.

Staying Informed

The last component of the checklist-based EMS for small-size business is the ability to stay informed. The person responsible must take a personal interest in environmental issues and legislative changes. This person must find a way to stay current with changes in legislation and changes in technology that impact environmental performance.

An easy and reliable method of staying current is to establish and support a network of environmental contacts. This network could form the basis of an informal or even a formal association.

You may also be encouraged to join a printers association, or affiliate with some other association. Your goal should be to stay in touch with people who are current with changes in the industry and the legislation.

4.2 Medium-Sized Business: A Policy-Based System

As a business grows, one person can't manage all aspects of the operation. So, things such as purchasing, production control, and human resources are parceled out to different people. For a medium-sized business, a policy-based EMS works well because it allows a company to assign responsibility to the specific people who control the various activities in the facility.

In this Section of the pollution prevention guide, we've included 12 different policies. As these are generic, you should tailor them to your organization.

Most of the policies do not contain specific legislative requirements. Those have been incorporated into the checklists in Section 2. Only if a policy is specifically legislation-based do we include it.

Rather, the policies have been written to be timeless, leaving it up to the responsible individuals to include the specific legislative requirements. The chart below lists the 12 policies that are included in this Section. Use this chart to record the names of the people who are responsible for each of the policies. There's a copy of this chart in Appendix 19.

List of Policies and People Responsible

Policy	Person Who is Responsible for the Policy
Environmental	
Air emissions	
Capital purchasing	
Chemical storage	
Environmental inspections/audits	
Government inspections	
Hazardous waste	
Nonhazardous waste and waste reduction	
Chemical purchasing	
Spill and emergency response	
Training	
Water discharges and water conservation	
Updating this responsibility chart	

Environmental Policy

Purpose
To commit our company to improving its environmental performance. (The policy can be a single paragraph or several pages long.) Our policy will include statements that do the following: (Source: Canadian Standards Association publication *PLUS 1117, Competing Leaner, Keener and Greener, A Small Business Guide to ISO 14000.*)

- Establish our relationship to the environment.
- Refer to standards, industry codes and guidelines.
- Identify conservation methods and pollution prevention techniques.
- Identify the key interested parties.
- Indicate the importance of education and training.

Below is an example of an environmental policy.

(Name of Company)

Environmental Policy

(Name of company) is committed to environmentally sound principles and practices. In addition to obeying all municipal, provincial and federal environmental statutes and laws, our practice will be to do the following:

- Minimize the generation of waste and dispose of the remainder in an environmentally sound manner.
- Ensure employees receive training in their specific work tasks to protect the environment from accidental damage or upset.
- Conduct regular assessments of our operations to ensure they are managed in a way that will control and reduce risk to the environment.
- Establish programs and procedures to monitor compliance with all legislative requirements.
- Implement site-specific environmental emergency response policies and procedures.
- Ensure that our corporate statement describing our environmental and recycling practices, policies and procedures will always be a document of public record.

____

CEO, president signature

Date issued: ___________ Date revised: ___________

Air Emissions Policy

Purpose
To ensure that the facility is operated in accordance with pertinent legislation, and that air emissions do not affect the neighbouring facilities, we will do the following:

- Keep a copy of Department of Environment's Air Quality Regulations.
- Contact your provincial Department of Environment and Labour once each year to ensure that the copy on file is the current copy.
- Review these regulations once each year to be sure we comply with all their requirements.
- Create a sketch of the plant site showing all stacks or other sources of air emissions. Store the sketch in the environmental file.
- Keep a copy in the environmental file of any test results from indoor or out door air sampling or sampling from stacks.
- Once each month conduct a formal odour and noise patrol to ensure there are no odours or noises emitted from the plant that may cause nuisance to neighbouring properties.
- Maintain records of these odour and noise patrols.
- Train receptionists and those answering the phones on off-shifts in the use of Odour and Noise Complaint Forms. Make these forms available to them.
- Coordinate this policy with the chemical purchasing policy and capital appropriation policy, to be sure that chemicals and equipment purchased do not contravene the pertinent air quality legislation, or cause odour or noise nuisance issues.

Date issued: ____________ Date revised: ____________

Capital Purchasing Policy

Purpose
To ensure that environmental impact is considered prior to the capital purchase or leasing of equipment we will do the following:

- Review all possible costs associated with complying with environmental legislation for discharge to air, water or land. Possible costs include the following:
  - the purchase and installation of pollution control equipment,
  - fees for the application and certification of pollution control equipment,
  - disposal costs of new liquid or solid waste, and
  - environmental audits or testing if the project involves purchasing or leasing land.
- Review all discharges of the new equipment or processes to ensure that any environmental impact has been identified and minimized.
- Review all permitting requirements to ensure all permits are in place before the equipment is ordered and or delivered.
- Review the installation site plans for appropriate environmental equipment and precautions such as ventilation, chemical storage areas, spill dikes, spill response kits, the capping of floor drains, etc.

Date issued: ____________ Date revised: ____________

Chemical Storage Policy

Purpose
To ensure that chemicals are accompanied by a material safety data sheet (MSDS) where required and stored in an acceptable manner, we will do the following:

- Keep copies of all necessary and relevant MSDSs readily available at each storage area, and keep a copy in the plant's central environmental files.
- Date all chemicals upon receipt and again when opened. Use them on a first-in, first-out basis.
- Store chemicals in their original labeled containers only.

If controlled products are transferred from a bulk storage container to a workplace container, a workplace label must be affixed to the workplace container. The workplace label must include:

- Name of the product.
- Information on how to use the product safely.
- Reference to the MSDS for further information.
- Periodically, inventory chemicals.
- Inspect all storage locations to check the following:
    - containers are sound and secure,
    - containers are kept sealed and or closed,
    - flammable liquids are stored as per the Provincial Fire Code and the local fire prevention authority,
    - flammable liquids are stored in grounded containers,
    - containers are labeled appropriately according to the Workplace Hazardous Materials Information System (WHMIS) Regulation and Dangerous Good Management Regulations,
    - controlled products are inventoried,
    - hazardous waste is stored in a secure area and protected from damage,
    - hazardous waste is not stored in excessive quantities or for excessive lengths of time,
    - chemicals are not outdated and are still fit for use,
    - there are no floor drains adjacent to storage areas,
    - chemical storage areas have appropriate spill response equipment, and
    - employees are trained in spill response in conjunction with the employee who is responsible for the training policy.
- Where it's possible, do not store chemicals outside.
- Provide protection from mechanical damage and provide secondary containment for any outside storage areas of chemicals
- Provide rubber mats to seal storm sewer drains in the event of a spill.
- Store compressed gases in secure areas, chain or restrain the containers to prevent falling or toppling, and store the containers upright with caps over the valves at all times
- Protect from overflow all tanks that are bulk filled. Keep them locked to ensure that they are only filled when a company representative is present.
- Walk the property monthly to check for staining or other signs of a chemical spill.
- Store PCBs in accordance with the Department of Environment PCB Management Regulations and the federal PCB regulation (SOR 92/507).

Date issued: ___________

Date revised: ___________

Environmental Inspections/Audits Policy

Purpose
To ensure that appropriate inspections are carried out and documented, we will do the following:

- Complete the checklists in Section 3 of this pollution prevention guide and store them in the environmental file as a benchmarking tool for the company.
- Complete the checklists in Appendices 17 and 18 and store the checklists in the environmental file
- Once each year, review the checklists in Section 3 of this guide (to be reviewed by the employees who are listed on the chart on page 4-5). Note any changes in legislative requirements and modify the checklists accordingly.
- Modify the checklists in Section 3 of this guide and use them once each year in an internal audit to determine the company's level of environmental compliance. Store the completed checklists in the environmental file.
- Review any outstanding to-do items from the checklist-based internal audits with the appropriate manager to initiate action and follow-up.
- Assign competent individuals to conduct the external audits. If the audit is required by third parties, or if the audit will be the basis of a purchasing decision, assign people who are accredited by the Canadian Environmental Auditing Association.
- Conduct external audits stemming from legal issues under the direction of the company's legal council.

Date issued: ___________ Date revised: ___________

Government Inspections Policy

Purpose
To ensure that visits by representatives of government agencies are handled courteously and effectively in the best interests of the company, we will do the following:

- If a representative of a government agency makes an unscheduled visit, the most senior employee noted on the contact list (that is available) will act as spokesperson, conduct the visit, and ask the following:
  - that the government representative identify him/herself and show credentials,
  - the specific nature of their business, and
  - what they would like to see.

- Limit the visit to the specific topic of interest that was identified by the representative.

- Make duplicate copies of anything the inspector copies, and take duplicate samples of anything the inspector samples. Store these duplicates in a secure area until any issues relating to the visit are resolved.

  (Note: A government inspector, operating under the authority of the Environmental Acts and Regulations, can inspect any part of a premise that is the subject of the act, and inspect anything that is reasonable to determine compliance with the act. He/she can also take and retain samples, and make copies of documents. To seize anything related to the possible offence, a government agency representative must have a warrant, reasonable grounds to think an offence is being or has been committed, or permission.)

- Bring to the attention of senior management any site visit that could result in further government agency activity.

Date issued: ____________

Date revised: ____________

Waste Dangerous Goods Management Policy

Purpose
To ensure that the facility complies with the Dangerous Goods Handling and Transportation Act and the Classification Criteria for Products, Substances and Organisms regulation.

(Note: These requirements include the proper classification, registration, manifesting, shipment and disposal of hazardous wastes. This policy must be based on the hazardous waste regulations that are in effect when the policy is enacted. The employee responsible for this policy is to ensure that the policy is kept up to date with the legislation.)

As a generator of waste, we will do the following:

- Register with the Department and obtain a provincial registration number.
  (This is done by completing a Waste Dangerous Goods Registration which is available from Department of the Environment NS: 902-424-5300, PEI: 902-368-5047. New Brunswick, Newfoundland contact your provincial representative (See Appendix 1)).
- Classify waste that is being generated and list each class of waste when registering, or subsequently add new classes of waste to existing provincial registration numbers.
- Train staff who handle the waste. A person is trained when:
  - the employer is satisfied that the person has received adequate training in the aspects of the handling, offering for transport, or transporting of dangerous goods related to the duties that he proposes to assign to the person federal Transportation of Dangerous Goods Act 1992), and
  - the employer has issued a certificate of training that indicates the date the training took place and the aspects of the handling, offering for transport, or transporting of dangerous goods for which the person was trained. (federal TDG Act 1992)
- A certificate of training is valid for thirty-six months. (federal TDG Act 1992)
- Keep copies of training records in the environmental file.
- Obtain approval for on-site disposal of waste.
- Use only licensed carriers of hazardous waste.
- Issue a purchase order to a contractor for transporting hazardous only if a copy of their license is attached to the office copy of the purchase order.
- Issue a purchase order to a contractor for transporting hazardous only if a copy of the license of the receiver (disposal, collection/transfer, or recycling operation)is attached to the office copy of the purchase order.
- Complete all manifests in accordance with the *Federal Transportation of Dangerous Goods Act*, available from Environment Canada. (See Appendix 1).
- Mail a copy of the manifest to the Provincial Department of Environment as indicated on the manifest form.

Waste Dangerous Goods Management Policy (continued)

- At the time of pick up of hazardous wastes by the registered carrier, the person responsible for this policy or a designate should be on hand to ensure that the necessary documentation for the shipment is present:

Date issued: ____________ Date revised: ____________

Nonhazardous Waste and Waste Reduction Policy

Purpose
To reduce waste and to ensure that the waste we generate is disposed of properly, we will initiate and maintain a waste minimization program. We will do the following:

- Measure the amount of waste produced and report to the management of the company.
- Set targets for waste reduction.
- Perform a monthly waste audit using the forms available in the Appendices.
- Recyclable and organic waste materials are source separated and managed appropriately according to Solid Waste Resource Management Regulations in Nova Scotia and New Brunswick, Waste Resource Management Regulations in PEI, and Waste Material Disposal Act and the Packaging Material Act in Newfoundland.
- Measure the amount of material that is recycled by the company and report to the management of the company.
- Continuously look for ways to increase the amount of waste that is recycled and ways to decrease the amount of waste to be disposed of.
- Involve production employees in efforts to reduce process-related waste such as makeready waste, running waste, and printing overages.
- Review both incoming and outgoing packaging materials and seek ways to reduce them.
- Ensure that the waste that is hauled for disposal is hauled by carriers with appropriate licenses and disposed of appropriately in government-authorized disposal sites.
- Cooperate with and support local recycling and waste exchange efforts.

Date issued: ____________ Date revised: ____________

Chemical Purchasing Policy

Purpose
To ensure that we do not purchase chemicals that have an undesirable effect on our employees and our environmental efforts, we will do the following:

- The person responsible for this policy will approve all new chemicals by considering the following:
  - WHMIS classification
  - potential impact on human health and the environment
  - air, water and waste discharges
  - handling requirements
  - storage issues as per the Dangerous Goods Management Regulations
- Document approval of the chemical using the Chemical Purchasing Authorization Form (Appendix 8).
- Screen all chemicals purchased for constituents that are on the Federal and Provincial phase out or banned list. [eg. Ozone Layer Protection Regulations (Nova Scotia) or Ozone Depleting Substances Regulations (New Brunswick, Newfoundland and Prince Edward Island) See Appendix 1.] These constituents include CFCs, HCFCs, Halons, chlorinated solvents, asbestos, mercury, lead, the NPRI list of 176 chemicals and 117 chemicals listed in ARET.
- Ensure there's a current MSDS for every chemical received in the plant either as purchased goods or samples.
- Assess for odour potential all chemicals containing volatile components.
- If the company operates a catalytic incinerator on a heatset press, and the chemical is used on the press, send a copy of the MSDS to the catalyst manufacturer to ensure that it does not have constituents that will affect the catalyst performance.
- If the chemical is to discharged to the sewer, assess it for conformance with the sewer use bylaw.
- If the chemical is to be shipped off-site as a hazardous waste, assess it for compliance with the hazardous waste registration that has been assigned to the company.

Date issued: ____________ Date revised: ____________

Spill and Emergency Response Policy

Purpose

To ensure that the company is prepared in the event of an emergency situation or crisis and also complies with the reporting and clean-up requirements imposed by environmental legislation, we will do the following:

- Review pertinent legislation to ensure that spill reporting requirements are met. Legislation includes the following:
  - federal, provincial and municipal legislation
  - the Environment Act, Dangerous Goods Handling and Transportation Act and the Ozone Depleting Substances Act (New Brunswick, Newfoundland and Prince Edward Island), Ozone Layer Protection Regulation and Emergency Spill Regulations (Nova Scotia).

- Give the following information when reporting a spill:
  - what was spilled
  - how much was spilled
  - what is being done to contain and clean up the spill
  - who (what company) do you represent
  - where are you

- **Do not** give the following information when reporting a spill:
  - why the spill occurred
  - who was responsible for the spill

- Post the contact list and provide training so that production level employees can immediately notify the appropriate personnel.

- If there's an emergency response team, make a list of members and train all employees regarding who is to be contacted, and what contacts are to be made if a spill happens outside of normal business hours.

- Identify vital points within the company. Vital Points are locations within the facility which may be the source of spill.

- Produce a site map that shows all vital points.

- Procure appropriate spill kits and locate them at or adjacent to all vital points.
  - show the location of all spill kits on the site map of vital points
  - inspect the spill kits monthly

- Establish spill response procedures. See Appendix 13.

- Dispose of, in an approved manner, all contaminated material collected during the spill. Use only licensed carriers to pick up waste material from the spill.

- Worker and public safety is a top priority in spill response.

Date issued: ___________ Date revised: ___________

Training Policy

Purpose
To ensure that training in environmental issues is performed as appropriate, we will do the following:

- Review all policies with the person who is responsible for them to identify training needs and requirements.
- Keep a master schedule to identify retraining dates. Training that must be repeated and/or reviewed includes:
    - TDG training
    - spill training
    - WHIMIS training
- Train new employees to be aware of the environmental aspects of their position. Update this training every two years.
- Train new employees in spill recognition and spill response. Update this training every two years.
- Train the people who are responsible for any of these policies so that they can implement the policies fully.
- Keep training records for all employees. (See Appendix 5.)
- Find a source of information to keep the company current about any training that's required by law.
- Provide awareness training in each of the company's environmental policies, and in media relations to all employees listed on the contact list.

Date issued: ___________ Date revised: ___________

Water Discharges and Water Usage Policy

Purpose
To ensure that all wastewater discharged from the facility meets legislative requirements and that water usage in the facility is minimized, we will do the following:

- Keep a current copy of our municipal sewer use bylaw and, if applicable, the water use bylaw on file.
- Verify that the wastewater discharges from the facility comply with the bylaws.
- Bylaw compliance will be determined through MSDS review and review of the source of discharges or through water testing by a government approved laboratory.
- Train employees so that they know which substances are prohibited in the sewer use bylaw.
- At all points of discharge (sinks, machine drains) post signs listing those substances that are prohibited for discharge.
- Cap or fit with rubber mats all floor drains in production areas to prevent spills from being discharged.
- Place a rubber mat near any drain that may conduct a spill to a storm water drain. Post a sign that alerts employees to the location of the rubber mat.
- Conduct a review of all processes and machines that use water to determine if the amount of water used is appropriate to the need. Evaluate the following:
  - fit any machine that continuously runs water with solenoids so that water runs only when it's required,
  - fit shower heads with low-flow devices,
  - fit wash-up stations with water control devices to limit water usage,
  - fit kitchen faucets with low-flow aerated spouts, and
  - install wash water recirculators where they are appropriate.
- Use the monthly water bill to monitor water usage and cost. Report the findings to the management of the company.

Date issued: ____________ Date revised: ____________

4.3 Large-Sized Business: An ISO 14001-Based System

ISO 14001 Environmental Management System is one of an internationally-recognized set of standards from the International Organization Standards (ISO). These standards are designed to be universally applicable. ISO 14001 suits companies with a global presence — sectors such as the oil industry that have international environmental scrutiny, and companies that require a verifiable environmental management system (EMS).

Elements of an ISO 14001 EMS

According to the Canadian Standards Association (<http://www.csa.ca>), there are six key elements of an ISO 14001 EMS:

Environmental Policy - the environmental policy and the requirements to pursue this policy via objectives, targets, and environmental programs

Planning - the analysis of the environmental aspects of the organization (including its processes, products and services as well as the goods and services used by the organization)

Implementation and operation - implementation and organization of processes to control and improve operational activities that are critical from an environmental perspective (including both products and services of an organization)

Checking and corrective action - checking and corrective action including the monitoring, measurement, and recording of the characteristics and activities that can have a significant impact on the environment

Management Review - review of the EMS by the organization's top management to ensure its continuing suitability, adequacy and effectiveness

Continual improvement - a key component to complete the cyclical process of plan, implement, check, review and continually improve

The ISO 14000 standards were developed with the following key principles in mind:

- They must result in better environmental management.
- They must be applicable in all nations.
- They should promote the broad interests of the public and the users of the standards.
- They should be cost-effective, nonprescriptive, and flexible, to allow them to meet the differing needs of organizations of any size worldwide.
- As part of their flexibility, they should be suitable for internal or external verification.
- They should be scientifically-based.
- Above all, they should be practical, useful and useable.

What are the steps in implementing ISO 14001?

Pursue ISO 14001 *only* when the decision is supported by management.

Consult the ISO 140001 documents from the Canadian Standards Association and use the following steps:

1. Appoint an EMS coordinator. If you are opting for third-party registration instead of self-certification, complete an application with a registration body (registrar).
2. Select your EMS registration date.

3. Conduct a pre-assessment review to determine the current status of your operations.
4. Establish the timeline for completing a policy manual, procedures manual and submitting the documentation to the registrar.
5. Assign responsibilities to the implementation team and establish timelines.
6. Once it has been determined that the company's documented EMS conforms to the requirements, invite your customer/supplier or registrar to audit your system and to provide evidence of conformance to ISO 14001.
7. Use your certification of registration for marketing purposes.
8. Continue to monitor and report progress.

How much does ISO 14001 implementation cost?

Registration costs of $10,000 to $100,000 (1998 costs) are common. Companies that don't require an independent third-party certification may self-declare that they are compliant with ISO 14001.

How long does ISO 14001 implementation take?

The time required to implement an EMS depends on the company's current status, its commitment to the process and the resources it is willing to allocate to it. While some companies can complete implementation in as few as six months, on average, it takes about 14 to 16 months to prepare for the first registration assessment.

For more information, contact the Canadian Standards Association (416-747-4000) for a copy of the manual entitled *Plus 14000: The ISO 14000 Essentials.*

References

Section 5: References

Note: Government laws and regulations discussed in the text are not referenced separately below.

Canadian Council of Ministers of the Environment (CCME). 1998 Draft. *Environmental Code of Practice for the Reduction of Volatile Organic Compound Emissions from the Commercial/Industrial Printing Industry.* CCME Management Plan Initiatives V308 and V613.

Jacques Whitford Environment Limited. January 1995. *Environmental Management Manual and Resource Guide.* Report to Nova Scotia Printing Industries Association, Project No. 9901.

Management of Solvents and Wipes in the Printing Industry. Factsheet 425.wp.9510. Solid and Hazardous Waste Education Center, University of Wisconsin Education. Extracted from the Internet at http://shwec.uwsp.edu

Ontario Printing & Imaging Association (OPIA). 1995. *Management Guide to a Safe Environment.*

Pferdehirt, Wayne P. 1993. Case Study: Roll the Presses but Hold the Wastes: P2 and the Printing Industry. Pollution Prevention Review. Autumn 1993.

United States Environmental Protection Agency (USEPA). 1990. *EPA Guides to Pollution Prevention. The Commercial Printing Industry.* EPA/625/7-90/008.

United States Environmental Protection Agency (USEPA). 1994a. Cleaner Technologies substitutes Assessment: Industry: Screen Printing Use Cluster: Screen Reclamation (Draft). Washington D.C.

United States Environmental Protection Agency (USEPA). 1994b. *Work Practice Alternatives for Screen Reclamation-Case Study 4: Screen Printing.* Design for the Environment Printing Project Factsheet.

United States Environmental Protection Agency (USEPA). 1996. *Screen Printing Project Bulletin 1.* Design for the Environment. EPA 742-F-95-008.

Waste Reduction Opportunities for Printers. Factsheet 425.wp.9408. Solid and Hazardous Waste Education Center, University of Wisconsin Education. Extracted from the Internet at http://shwec.uwsp.edu

Appendices

Table of Contents — Appendices

Use these appendices in conjunction with the *Pollution Prevention Guide for Printers in Atlantic Canada.*

APPENDIX 1 Telephone Numbers for Government and Other Resources
APPENDIX 2 Tank Inventory
APPENDIX 3 Waste Audit Inventory
APPENDIX 4 Use of Neighbouring Properties
APPENDIX 5 Training Records
APPENDIX 6 Standard Environmental Checklist
APPENDIX 7 Using MSDS for Solvent and Chemical Selection
APPENDIX 8 Chemical Purchasing Authorization Form
APPENDIX 9 Common Chemical Product Management (1999)
APPENDIX 10 Flowsheet Showing Inputs and Outputs from a Typical Lithographic Printing Operation
APPENDIX 11 EcoLogo Information
APPENDIX 12 Emergency Contacts
APPENDIX 13 Spill Response Procedures
APPENDIX 14 Workplace Hazardous Materials Information System
APPENDIX 15 Record of Housekeeping
APPENDIX 16 Containment Tank Criteria
APPENDIX 17 Monthly Inspection Checksheet
APPENDIX 18 Every Six Months Inspection Checksheet
APPENDIX 19 List of Policies and People Responsible
APPENDIX 20 National Pollutant Release Inventory Substances (NPRI)
APPENDIX 21 Accelerated Reduction/Elimanation of Toxics Program (ARET)
APPENDIX 22 Sewer Discharge Bylaw
APPENDIX 23 VOC Emission Performance Targets as a function of Printing Press type

APPENDIX 1
Telephone Numbers for Government and Other Resources

Environment Canada (Federal):

Provinces	EC Representative	Telephone	E-mail
Regional (Atlantic)	Rodger Albright	(902) 426-4480	rodger.albright@ec.gc.ca
New Brunswick	George Lindsay	(506) 452-3286	george.lindsay@ec.gc.ca
Newfoundland	Brian Power	(709) 772-5491	brian.power@ec.gc.ca
Nova Scotia	Dave Kelly	(902) 426-0739	dave.kelly@ec.gc.ca
Prince Edward Island	John Keefe	(902) 566-7042	john.keefe@ec.gc.ca

Department of Environment (Provincial):

Province	Representative	Telephone	E-mail
New Brunswick	Denis Marquis	(506) 453-2235	denis.marquis@gov.nb.ca
Newfoundland	Derrick Maddocks	(709) 729-5782	dmaddock@env.gov.nf.ca
Nova Scotia	Lynda Rankin	(902) 424-2578	rankinlx@gov.ns.ca
Prince Edward Island	Don Jardin	(902)368-5035	dejardin@gov.pe.ca

Department of Labour (Provincial):
(Occupational Health and Safety Contacts)

Province	Telephone
New Brunswick	(506) 632-2200
Newfoundland	1-800-563-5471
Nova Scotia	1-800-952-2687
Prince Edward Island	(902) 368-5680

Other Agencies:

Eco-Efficiency Centre (Burnside), Dartmouth, Nova Scotia
Ms. Peggy Crawford Kellock, Coordinator, Tel: (902) 461-6704, E-mail: kpcrawfo@is.dal.ca

Resource Recovery Fund Board Inc., Debert, Nova Scotia
Tel: 1-800-665-LESS (5377)

Clean Nova Scotia and Nova Scotia Materials Exchange
Tel: (902) 420-3467

Municipalities:

New Brunswick
(Municipalities, Townships and Counties)

City of Bathurst	(506) 548-0400
Ville de Beresford	(506) 542-2727
City of Campbellton	(506) 789-2700
Ville de Caraquet	(506) 726-2727
Town of Dalhousie	(506) 684-7600
Town of Diepp	(506) 877-7900
Ville d'Edmundston	(506) 739-2115
City of Fredricton	(506) 460-2020
Village of Gondola Point	(506) 849-2588
Town of Grand Bay	(506) 738-6400
Ville de Grand-Sault	(506) 475-7777
Village of Minto	(506) 327-3383
City of Miramichi	(506) 623-2200
City of Moncton	(506) 853-3333

New Foundland
(Municipalities and Townships)

Town of Bay Roberts	(709) 786-2126
Town of Bishop's Falls	(709) 258-6581
Town of Botwood	(709) 257-2839
Town of Burin	(709) 891-1760
Town of Carbonear	(709) 596-3831
Town of Clarenville	(709) 466-7937
Town of Conception Bay South	(709) 834-6500
City of Corner Brook	(709) 637-1630
Town of Deer Lake	(709) 635-2451
Town of Gander	(709) 651-2420
Town of Grand Bank	(709) 832-1600
Town of Grand Falls-Windsor	(709) 489-3573
Town of Happy Valley-Goose Bay	(709) 896-3321
Town of Harbour Breton	(709) 885-2354

APPENDIX 1
Telephone Numbers for Government and Other Resources

Town of Oromocto	(506) 357-4400
Village of Perth-Andover	(506) 273-4959
Village of Petitcodiac	(506) 756-3140
Town of Quispamsis	(506) 849-5778
Town of Riverview	(506) 387-2020
Town of Sackville	(506) 364-3930
City of Saint John	(506) 658-2881
Ville de Saint-Basile	(506) 263-5943
Ville de Shediac	(506) 532-7000
Town of St. Andrews	(506) 529-5120
Town of St. Stephen	(506) 466-7700
Town of Sussex	(506) 432-4540
Town of Woodstock	(506) 325-4600

Town of Harbour Grace	(709) 596-3631
Town of Labrador City	(709) 944-2621
Town of Lewisporte	(709) 535-2737
Town of Marystown	(709) 279-1661
City of Mount Pearl	(709) 748-1008
Town of Placentia	(709) 227-2151
Town of Portugal Cove-St. Phillips	(709) 895-6594
Town of Springdale	(709) 673-3439
Town of St. Alban's	(709) 538-3132
Town of St. Anthony	(709) 454-3454
City of St. John's	(709) 576-8396
Town of Stephenville	(709) 643-9123
Town of Torbay	(709) 437-6532
Town of Wabana	(709) 488-2990
Town of Wabush	(709) 282-5696

Nova Scotia

Town of Amherst	(902) 667-3352
Municipality of the County of Annapolis	(902) 532-2331
Municipality of the County of Antigonish	(902) 863-1117
Town of Antigonish	(902) 863-1312
District of Argyle	(902) 648-2311
District of Barrington	(902) 637-2015
Town of Bedford	(902) 494-8340
Town of Bridgewater	(902) 543-4651
Town of Canso	(902) 366-2525
Municipality of Cape Breton	(902) 563-5005
District of Chester	(902) 275-3554
District of Clare	(902) 769-2031
County of Colchester	(902) 897-3160
County of Cumberland	(902) 667-2313
City of Dartmouth	(902) 481-7533
District of Digby	(902) 245-4777
Town of Digby	(902) 245-4769
Town of Dominion	(902) 849-2401
District of East Hants	(902) 758-2299
Town of Glace Bay	(902) 849-5541
District of Guyborough	(902) 533-3705
City of Halifax	(902) 490-4026
County of Halifax	(902) 453-7526
County of Inverness	(902) 787-2274
Town of Kentville	(902) 679-2500
County of Kings	(902) 678-6141
Town of Liverpool	(902) 354-5701
Town of Louisbourg	(902) 733-2014
District of Lunenburg	(902) 543-8181
Town of Lunenburg	(902) 634-4410
Town of Mahone Bay	(902) 624-8327
Town of Middleton	(902) 825-4841
Town of Mulgrave	(902) 747-2243
Town of New Glasgow	(902) 755-7788
Town of New Waterford	(902) 862-6401
Town of North Dydney	(902) 794-7213
Town of Parrsboro	(902) 254-2036
County of Pictou	(902) 485-4311
Town of Pictou	(902) 485-4372
Town of Port Hawkesbury	(902) 625-2746
Municipality of the County of Queens	(902) 354-3453

Prince Edward Island

Community of Abram's Village	(902) 854-2501
Community of Belfast	(902) 659-2989
Town of Borden	(902) 855-2225
Community of Bunbury	(902) 569-4217
Village of Cardigan	(902) 583-2198
Community of Central Bedeque	(902) 436-2148
City of Charlottetown	(902) 566-5548
Community of Cornwall	(902) 566-2354
Community of Crapaud	(902) 658-2094
Community of Cross Roads	(902) 569-2048
Community of East Royalty	(902) 629-1513
Town of Georgetown	(902) 652-2924
Community of Hillsborough Park	(902) 892-8628
Town of Kensington	(902) 836-3781
Community of Keppoch-Kinlock	(902) 569-2965
Community of Kinkora	(902) 887-2868
Community of Miscouche	(902) 436-4962
Town of Montague	(902) 838-2528
Community of Morell	(902) 961-2420
Community of Murray Harbour	(902) 962-3665
Community of Murray River	(902) 962-2615
Municipality of North River	(902) 566-4951
Community of O'Leary	(902) 859-3311
Town of Parkdale	(902) 368-8182
Community of Sherwood	(902) 894-5041
Town of Souris	(902) 687-2157
Community of Southport	(902) 569-3914
Community of St. Eleanors	(902) 436-2782
Community of St. Louis	(902) 882-2093
Community of St. Peter's Bay	(902) 961-2307
Municipality of Stanley Bridge	(902) 963-2078
Town of Stratford	(902) 569-1995
Town of Summerside	(902) 432-1230
Community of Tignish	(902) 882-2600
Community of Tyne Valley	(902) 831-2928
Community of Victoria	(902) 658-2085
Community of Wellington	(902) 436-4877
Community of West Royalty	(902) 368-1025
Community of Wilmot	(902) 436-8405
Community of Winsloe	(902) 628-1598

APPENDIX 1

Telephone Numbers for Government and Other Resources

County of Richmond	(902) 226-2400
District of Shelburne	(902) 875-3083
Town of Shelburne	(902) 875-2991
Town of Springhill	(902) 597-3751
District of St. Mary's	(902) 522-2049
Town of Stellarton	(902) 752-2114
City of Sydney	(902) 563-7534
Town of Sydney Mines	(902) 736-6226
Town of Trenton	(902) 752-5311
Town of Truro	(902) 895-4484
Municipality of West Hants	(902) 798-8391
Town of Westville	(902) 755-7788
Town of Windsor	(902) 798-2275
Town of Wolfville	(902) 542-5767
Municipality of the District of Yarmouth	(902) 742-7159
Town of Yarmouth	(902) 742-8565

APPENDIX 2 *Tank Inventory*

Complete the following inventory for all USTs and ASTs used currently and in the past.

Underground Tanks (USTs)

Size	Contents	Year Installed	Construction Materials	Year Removed	Test Report on File	Leak Detection Method	Corrosion Protection	Location

Aboveground Tanks (ASTs)

Size	Contents	Year Installed	Construction Materials	Year Removed	Test Report on File	Leak Detection Method	Spill Protection	Location

APPENDIX 3 *Waste Audit Inventory*

Make copies of this form and use it to audit all areas of your facility including the office, prepress, pressroom, finishing, storage/ warehouse, chemical storage, maintenance, grounds and cafeteria

Area	Type of Waste Generated	Quantity per Month	Disposal Metthod	Cost per Month

APPENDIX 4 Uses of Neighbouring Properties

Use this form to record details about the uses of properties adjacent to your facility (Section 3.6, items 11 - 12).

To the North

Are there signs of visible staining on the ground? Yes ☐ No ☐

Are there patches of dead or dying vegetation? Yes ☐ No ☐

Are there pails, barrels, tote tanks or aboveground storage tanks around the building? Yes ☐ No ☐

- Is there evidence of leaking from these? Yes ☐ No ☐
- Do all tanks and containers have spill containment? Yes ☐ No ☐

Are the grounds free of clutter, debris and disorganized storage? Yes ☐ No ☐

Is there any known contamination? Yes ☐ No ☐

What is the distance from your fence line to their building or operation? Yes ☐ No ☐

Was the site involved in past environmental problems? Yes ☐ No ☐

In NS, contact Department of the Environment, Environment Registry Coordinator at 902-424-2549.
New Brunswick, Newfoundland and Prince Edward Island contact your provincial representative.
(See Appendix 1).

To the South

Are there signs of visible staining on the ground? Yes ☐ No ☐

Are there patches of dead or dying vegetation? Yes ☐ No ☐

Are there pails, barrels, tote tanks or aboveground storage tanks around the building? Yes ☐ No ☐

- Is there evidence of leaking from these? Yes ☐ No ☐
- Do all tanks and containers have spill containment? Yes ☐ No ☐

Are the grounds free of clutter, debris and disorganized storage? Yes ☐ No ☐

Is there any known contamination? Yes ☐ No ☐

What is the distance from your fence line to their building or operation? Yes ☐ No ☐

Was the site involved in past environmental problems? Yes ☐ No ☐

In NS, contact Department of the Environment, Environment Registry Coordinator at 902-424-2549.
New Brunswick, Newfoundland and Prince Edward Island contact your provincial representative.
(See Appendix 1).

APPENDIX 4
Uses of Neighbouring Properties (continued)

Use this form to record details about the uses of properties adjacent to your facility (Section 3.6, items 11 - 12).

To the East

Are there signs of visible staining on the ground? Yes ☐ No ☐

Are there patches of dead or dying vegetation? Yes ☐ No ☐

Are there pails, barrels, tote tanks or aboveground storage tanks around the building? Yes ☐ No ☐

Is there evidence of leaking from these? Yes ☐ No ☐

Do all tanks and containers have spill containment? Yes ☐ No ☐

Are the grounds free of clutter, debris and disorganized storage? Yes ☐ No ☐

Is there any known contamination? Yes ☐ No ☐

What is the distance from your fence line to their building or operation? Yes ☐ No ☐

Was the site involved in past environmental problems? Yes ☐ No ☐
In NS, contact Department of the Environment, Environment Registry Coordinator at 902-424-2549.
New Brunswick, Newfoundland and Prince Edward Island contact your provincial representative.
(See Appendix 1).

To the West

Are there signs of visible staining on the ground? Yes ☐ No ☐

Are there patches of dead or dying vegetation? Yes ☐ No ☐

Are there pails, barrels, tote tanks or aboveground storage tanks around the building? Yes ☐ No ☐

Is there evidence of leaking from these? Yes ☐ No ☐

Do all tanks and containers have spill containment? Yes ☐ No ☐

Are the grounds free of clutter, debris and disorganized storage? Yes ☐ No ☐

Is there any known contamination? Yes ☐ No ☐

What is the distance from your fence line to their building or operation? Yes ☐ No ☐

Was the site involved in past environmental problems? Yes ☐ No ☐
In NS, contact Department of the Environment, Environment Registry Coordinator at 902-424-2549.
New Brunswick, Newfoundland and Prince Edward Island contact your provincial representative.
(See Appendix 1).

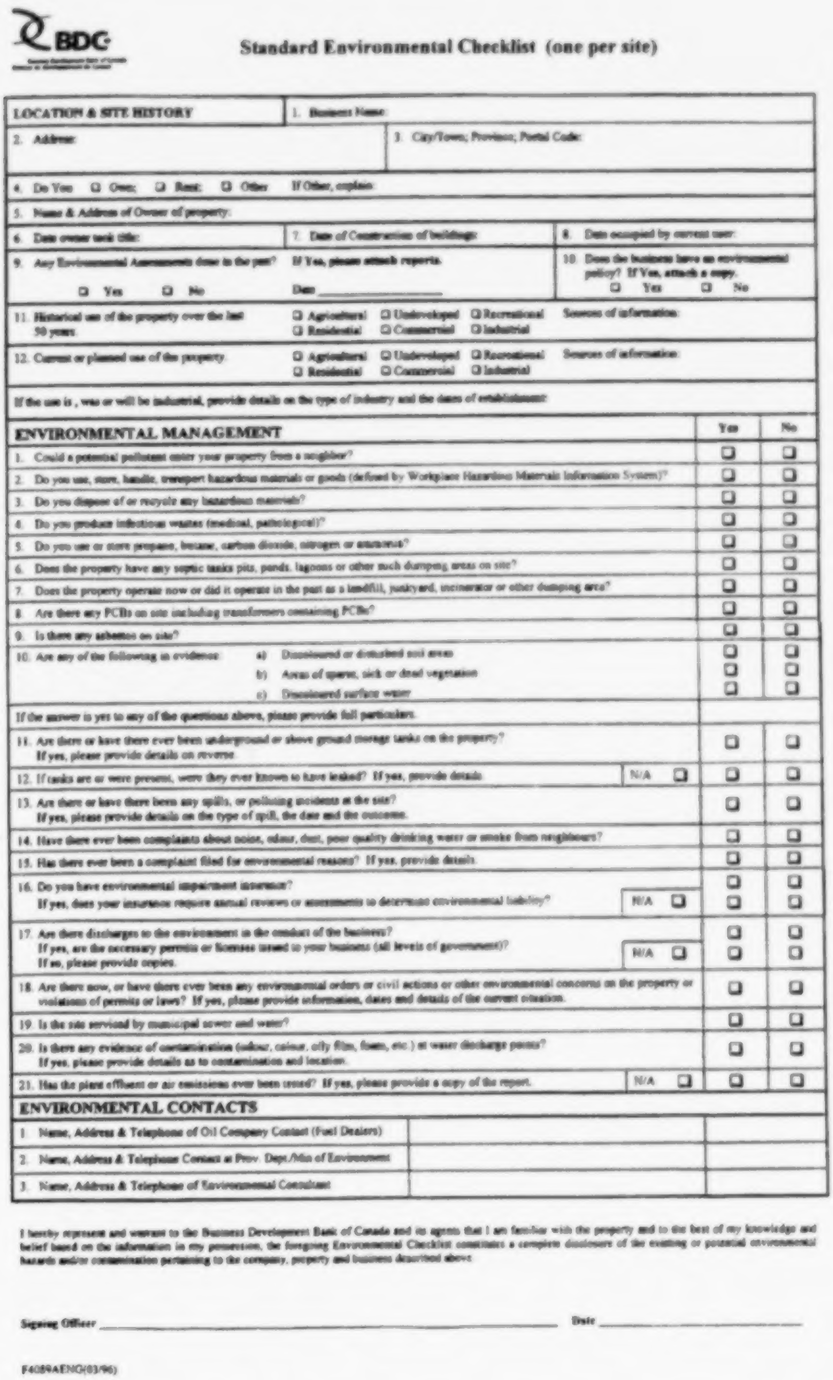
APPENDIX 5 *Training Records*

Use this form to record details about employee training on environmental and health and safety issues.

Training Record for Course (name) ______________________________

Employee Name	Employee Signature	Frequency	Date of Training	Date Next Training is Due

APPENDIX 6 Standard Environmental Checklist



BDC

Standard Environmental Checklist (one per site)

LOCATION & SITE HISTORY	1. Business Name:	
2. Address:	3. City/Town; Province; Postal Code:	
4. Do You ☐ Own; ☐ Rent; ☐ Other If Other, explain:		
5. Name & Address of Owner of property:		
6. Date owner took title:	7. Date of Construction of buildings:	8. Date occupied by current user:
9. Any Environmental Assessments done in the past? ☐ Yes ☐ No	If Yes, please attach reports. Date ______________	10. Does the business have an environmental policy? If Yes, attach a copy. ☐ Yes ☐ No
11. Historical use of the property over the last 50 years.	☐ Agricultural ☐ Undeveloped ☐ Recreational ☐ Residential ☐ Commercial ☐ Industrial	Sources of information:
12. Current or planned use of the property.	☐ Agricultural ☐ Undeveloped ☐ Recreational ☐ Residential ☐ Commercial ☐ Industrial	Sources of information:
If the use is , was or will be industrial, provide details on the type of industry and the dates of establishment:		

ENVIRONMENTAL MANAGEMENT		Yes	No
1. Could a potential pollutant enter your property from a neighbor?		☐	☐
2. Do you use, store, handle, transport hazardous materials or goods (defined by Workplace Hazardous Materials Information System)?		☐	☐
3. Do you dispose of or recycle any hazardous materials?		☐	☐
4. Do you produce infectious wastes (medical, pathological)?		☐	☐
5. Do you use or store propane, butane, carbon dioxide, nitrogen or ammonia?		☐	☐
6. Does the property have any septic tanks pits, ponds, lagoons or other such dumping areas on site?		☐	☐
7. Does the property operate now or did it operate in the past as a landfill, junkyard, incinerator or other dumping area?		☐	☐
8. Are there any PCBs on site including transformers containing PCBs?		☐	☐
9. Is there any asbestos on site?		☐	☐
10. Are any of the following in evidence: a) Discoloured or disturbed soil areas b) Areas of sparse, sick or dead vegetation c) Discoloured surface water		☐ ☐ ☐	☐ ☐ ☐
If the answer is yes to any of the questions above, please provide full particulars.			
11. Are there or have there ever been underground or above ground storage tanks on the property? If yes, please provide details on reverse.		☐	☐
12. If tanks are or were present, were they ever known to have leaked? If yes, provide details.	N/A ☐	☐	☐
13. Are there or have there been any spills, or polluting incidents at the site? If yes, please provide details on the type of spill, the date and the outcome.		☐	☐
14. Have there ever been complaints about noise, odour, dust, poor quality drinking water or smoke from neighbours?		☐	☐
15. Has there ever been a complaint filed for environmental reasons? If yes, provide details.		☐	☐
16. Do you have environmental impairment insurance? If yes, does your insurance require annual reviews or assessments to determine environmental liability?	N/A ☐	☐ ☐	☐ ☐
17. Are there discharges to the environment in the conduct of the business? If yes, are the necessary permits or licenses issued to your business (all levels of government)? If so, please provide copies.	N/A ☐	☐ ☐	☐ ☐
18. Are there now, or have there ever been any environmental orders or civil actions or other environmental concerns on the property or violations of permits or laws? If yes, please provide information, dates and details of the current situation.		☐	☐
19. Is the site serviced by municipal sewer and water?		☐	☐
20. Is there any evidence of contamination (odour, colour, oily film, foam, etc.) at water discharge points? If yes, please provide details as to contamination and location.		☐	☐
21. Has the plant effluent or air emissions ever been tested? If yes, please provide a copy of the report.	N/A ☐	☐	☐

ENVIRONMENTAL CONTACTS		
1. Name, Address & Telephone of Oil Company Contact (Fuel Dealers)		
2. Name, Address & Telephone Contact at Prov. Dept./Min of Environment		
3. Name, Address & Telephone of Environmental Consultant		

I hereby represent and warrant to the Business Development Bank of Canada and its agents that I am familiar with the property and to the best of my knowledge and belief based on the information in my possession, the foregoing Environmental Checklist constitutes a complete disclosure of the existing or potential environmental hazards and/or contamination pertaining to the company, property and business described above.

Signing Officer ______________________________ Date ____________________

F4089AENG(03/96)

APPENDIX 7
Using MSDS for Solvent and Chemical Selection

Solid and Hazardous Waste Education Center
Waste Education Series
Cooperative Extension • University of Wisconsin-Extension

Reading and Using a Material Safety Data Sheet (MSDS)

According to the Hazard Communication Standard of the Occupational Safety and Health Act of 1970 and its amendments an employer is required to maintain Material Safety Data Sheets (MSDS) for all products used in their production process, and make this information available to the employees. It is the responsibility of the material manufacturer to provide the MSDSs to the employer. An MSDS is a useful source of information for employee safety and health, but can also be a valuable tool for and hazardous waste minimization programs.

Contents of an MSDS

Although the format of an MSDS can vary slightly from one manufacturer to the next, all MSDS are required to contain certain information. This information can be broken down into seven categories:

1. Product Identification
2. Material Composition/Ingredients
3. Physical and Chemical Characteristics (including fire and reactivity hazard information)
4. Health Hazard Information (includes first aid procedures)
5. Storage and Handling Procedures
6. Protective Clothing and Equipment Recommendations
7. Manufacturer's Information and Date of MSDS Completion

MSDS: Valuable Information for Pollution Prevention

Physical and Chemical Characteristics can help you identify regulations that apply to the use and disposal of the material.

Storage and Handling Procedures can help you prevent and minimize the impacts of spills and leaks.

Physical and Chemical characteristics and health hazard information can help you in choosing a less hazardous material for your company.

Note: For additional information about pollution prevention opportunities for your business, contact SHWEC Pollution Prevention Specialists at 608/262-0385.

Product Identification

Product Identification includes the product name as it appears on the product label. Other information may include a copy of the warning label statement and the National Fire Protection Association's (NFPA) hazard ratings (zero to four: where zero constitutes minimal hazard and four an extreme hazard) for health, flammability, and reactivity. Health represents the potential for exposure to the material to produce injury or sickness. Flammability represents the susceptibility of the material to burning. Reactivity indicates the susceptibility of the material to release energy under certain conditions. NFPA ratings provide a good summarization of the material's hazardous characteristics.

Material Composition/Ingredients

This information includes chemical or common names, and the CAS (Chemical Abstract Service) numbers of the ingredients which may contribute to health or safety hazards.

Physical and Chemical Characteristics

This section describes many of the properties of the chemical. Physical and chemical characteristics include vapor pressure, flashpoint, flammability, and reactivity.

- Vapor pressure indicates the rate at which the product evaporates. Lower vapor pressure means a slower rate of evaporation.

- Flash point is the lowest temperature at which a material's vapors will ignite and burn when exposed to an ignition source.

- Flammability of a material can be determined from the data provided on the upper and lower flammability limits. These values are expressed as a percentage of fuel vapors in air. Vapor concentrations below the lower limit will not have sufficient fuel to ignite, and concentrations above the upper limit will be too 'rich' to ignite.

- Reactivity concerns any physical or chemical transformation of the material due to contact with air, water or other materials, or the ability of the material to self-react under certain environmental conditions. If certain types of reactions are possible, they will be specifically mentioned by name. Two of these special reactions are oxidation, and corrosion. Oxidizers are compounds which promote combustion when in contact with flammable materials. Corrosives are materials which erode or dissolve other materials (this may include bodily tissues).

Other valuable information that may be presented includes the material's vapor density as compared to air (denser vapors tend to collect and travel at ground level), percent volatiles by volume, and material appearance and odor.

Health Hazard Information

Health hazard information on the material will include any signs or symptoms of exposure and any medical conditions which are known to be aggravated by exposure to the material is given here. Primary routes of entry, or how people are commonly exposed to the material (i.e., inhalation, skin contact, etc.), are discussed here. Exposure limits for the material or its chemical constituents are listed. These limits include the OSHA Permissible Exposure Limit (PEL), the maximum exposure allowed by law; and the Threshold Limit Value (TLV), the recommended maximum exposure by the American Conference of Governmental Industrial Hygienists. Any information on the material or its component's ability to cause cancer will also be found here. Emergency first aid procedures for overexposure based on the route of entry should also be included.

Storage and Handling Procedures

This section includes information on any generally applicable precautions for safe storage and use of the material. These precautions include: storage guidelines, protective measures during repair and maintenance of equipment involved with the material, and procedures for clean up of spills and leaks. It is important to note that just because a raw material is not a hazardous material does not mean that the material remains nonhazardous throughout your production process. For example, hazardous residues can render a used cleaning solution a hazardous waste. Remember determination of hazardousness is based on the characteristics of the waste, which may have changed during production from the characteristics of the virgin material.

Protective Clothing and Equipment Recommendations

Information on general applicable control measures to reduce the risk associated with the material will be found here. These measures include appropriate engineering controls, work practices, and personal protective equipment (such as gloves, eye protection, etc.).

Manufacturer's Information and Date of MSDS Completion

This section includes the name, address, and telephone number of the material manufacturer. Most manufacturers have customer service operations which can be an excellent source of additional information.

Using an MSDS in Your Pollution Prevention Program

The information in an MSDS can help improve your waste reduction and management efforts. In particular, you can use the information on an MSDS to help you (1) select products that generate less hazardous wastes or emissions; (2) identify regulations that certain materials may be subject to; and (3) ensure that your material and waste management procedures are appropriate for current material usage. A discussion of each of these follows.

Selecting the Appropriate, Less Hazardous Materials for Your Company

Substituting hazardous materials with less hazardous ones is not only good for the environment, it's good for your bottom line. The waste produced from hazardous materials becomes hazardous waste with all the special storage, handling and disposal costs mandated by regulation. Hazardous materials in your workplace can be a health and safety risk for your employees, and may be reflected in higher insurance premiums. Perhaps most importantly, hazardous waste can expose your company to significant long-term financial liabilities if those wastes are determined to have contributed to environmental damage. In short, using hazardous materials typically adds cost.

Each section of the MSDS can be used to evaluate current materials in use versus possible substitutes. Specific areas that should be looked at are:

- Product Identification - Are any of the products NFPA health, flammability, or reactivity hazard ratings high? Does the products warning label state *danger*? (This information can be used as a 'first-cut' screen to raise flags when reviewing products or comparing alternatives.)

- Material Composition/Ingredients - Are there ingredients that would define this material as a hazardous material or hazardous waste?

- Physical and Chemical Characteristics - Does this material have a high percent of volatiles? Does it evaporate rapidly? (This information will relate to the material's tendency to produce air emissions.) How flammable is this material? Is it corrosive or reactive? (This information will identify special handling required.)

- Health Hazard Information - Does this material present a health and safety risk to my employees?

- Storage and Handling Procedures and Protective Clothing and Equipment Recommendations - Are special (and potentially costly) storage and handling procedures or equipment needed with this material?

Be aware when comparing MSDSs that not all manufacturers are equivalent in the amount of information they provide. Many manufacturers go beyond providing the minimum required information. Don't penalize a product because the manufacturer is particularly forthcoming about product content and precautions. Be suspicious about non-technical 'enviro-marketing' terms such as biodegradable, non-toxic, and environmentally-friendly. Always review specific data in the MSDS to determine the validity of such claims. Do not hesitate to call the manufacturer if more information is needed.

Identifying Hazardous Materials Regulations that Apply to Your Company

Hazardous materials require special tracking, handling, and disposal procedures according to federal and state regulations. Which regulations apply to a company depend on the particular materials present and the quantities stored and disposed of. Information under the Material Composition/Ingredients and Physical and Chemical Characteristics sections can help you identify which regulations apply to you. Material ingredients listed under Material Composition/Ingredients should be compared to the listing of substances covered by the particular regulation in question. For example: reportable air contaminants in Wisconsin are listed in Table 1 of Section NR 438 Wisconsin Administrative Code; Air Contaminant Emission Inventory Reporting Requirements. First, compare this list to the ingredients of the materials used in your facility. Second, if there is a match, then more detailed information on emission quantities will need to be gathered. If there is no match between the materials you use and the listed materials, then this particular regulation does not apply to you.

Physical and Chemical Characteristics can also be helpful in identifying environmental regulations that must be complied with. For example under the federal Resource Conservation and Recovery Act (RCRA) a list of hazardous wastes is provided, but additional wastes may be characterized as hazardous based on the characteristics of the waste. So a comparison of lists alone is not sufficient. In this case the waste in question must be evaluated against the four characteristics of hazardous waste in RCRA. These characteristics are (1) ignitability, (2) corrosivity, (3) reactivity, (4) toxicity. Ignitable substances can be identified by flash points less than 140 degrees F. Corrosive materials may be labeled directly, or can be detected from the pH (if given). A pH of 2 or less or 12.5 or more is a corrosive. Reactivity of a material will be specifically mentioned. Toxicity, as defined by RCRA, cannot be identified directly from the MSDS.

Audit to Improve Your Hazardous Material Storage and Handling Procedures

Proper storage and handling can prevent or minimize the impact of spills and leaks. Spills and leaks can waste raw materials, threaten employee health and safety, or contaminate soil or groundwater, all of which adds up to unwanted costs. The information in the MSDS represents sound practices for the storage, handling, and spill or leak response. A point by point comparison of your procedures against those in the MSDS can show you where procedural changes are needed, personnel training required, or modifications may be necessary.

*A Cooperative Project
between the
U.S. Environmental
Protection Agency
and the
Printing Trade
Associations
Nationwide*

October 1996

EPA 744-F-96-015

design FOR THE ENVIRONMENT

Lithography Project Bulletin 4

Bulletin Highlights

This Bulletin highlights How to Find a Better Blanket Wash for Your Company

- The Blanket Wash Comparison Worksheet
- A Description of Nine Different Cost Categories

Also in This Bulletin

- Hidden Costs of Your Blanket Wash
- Questions to Ask When You Call Your Blanket Wash Supplier
- What You Can Do to Compare Blanket Washes: A Checklist
- Use the Worksheet to Choose Other Chemicals for Your Shop

A Worksheet to Help You Choose a Better Wash

There are many factors to consider when choosing a blanket wash or other press chemical that is best for your shop. Perhaps the most obvious are purchase price and performance. But there are other, less obvious factors that are just as important. How flammable is the wash? Is it a regulated material? How hazardous is it to worker health or to the environment? Even if it is cheaper to buy, a wash that is more hazardous, or one that is regulated, may have large hidden costs that make it more expensive in the end.

The worksheet contained in this bulletin identifies many of these costs, both obvious and not so obvious. Use it to compare your blanket wash options - it may help you find a blanket wash that is better for your shop.

The Worksheet: How Does it Work?

The worksheet can help you compare test blanket washes to your normal wash. Complete the worksheet after you (or your press operators) know how well the test wash works (this may take a week or two of use). When you answer the questions and add up the scores, the worksheet will tell you if the test wash may be a better choice for your shop.

All information needed for the worksheet is available from:

- **the press operators in your shop who have been using the test wash**
- **the Material Safety Data Sheet (MSDS) that comes with the blanket wash**
- **your blanket wash supplier**

If the Final Worksheet Score Is...	Then...
Greater than zero	⇛ The test wash may be a better choice than your normal blanket wash
Less than zero	⇛ The test wash may not be a better choice for your facility than your normal blanket wash
Equal to zero*	⇛ The test wash is approximately the same as your normal wash

* If the test wash appears to be approximately the same as your normal wash overall, look at each individual category. Which is most important to you? Different scores in that category may still help you decide which blanket wash is best for your shop.

The Worksheet

Could a substitute blanket wash be a better choice for your facility?

Use the scorecard below to figure out whether a substitute blanket wash may be a better choice for your facility. Add the scores to see if the substitute wash is better, worse, or the same as your current wash.

Test Wash: ______________________________

Supplier Name and Phone: ______________________________

Compare the test wash to the blanket wash you normally use for the following questions and enter the score of your answer in the column on the right:

	Scores					Enter Score Below
Compared to your normal blanket wash,	-2	-1	0	1	2	
1 Is the price per gallon of the test blanket wash:	Much more	More	Same	Less	Much less	
2 Is the amount of test wash used to clean each blanket:	Much more	More	Same	Less	Much less	
3 Is the time required to clean a blanket with the test wash:	Much more	More	Same	Less	Much less	
4 What does the press operator think of the test blanket wash? Is it	Much worse	Worse	Same	Better	Much better	

Consult MSDS forms and contact the blanket wash supplier to answer questions 5-9:

5 Does the test wash contain hazardous chemicals as defined by Federal/State environmental regulations or OSHA? Yes = -2 No = 2	

	Scores					
Compared to your normal blanket wash,	-2	-1	0	1	2	
6 Is the vapor pressure of the test wash:	Much higher	Higher	Same	Lower	Much Lower	
7 Is the percentage VOCs of the test wash:	Much higher	Higher	Same	Lower	Much lower	
8 Is the flash point of the test wash:	Much lower	Lower	Same	Higher	Much higher	
9 How does the test wash compare on any other factors:	Much worse	Worse	Same	Better	Much better	

Total ☐

Add all nine scores on this worksheet to get the total score for this test blanket wash.
Remember, when adding negative numbers -2 + 2 = 0.

What does the score mean?

A score greater than zero means the test wash may be a better choice than your facility's regular wash, a score of zero indicates that the test wash is approximately the same, and a score of less than zero indicates that the test wash may not be a better choice for your facility.

Worksheet Questions

What Do They Mean?

1 **Purchase price: Compared to your normal blanket wash, Is the price per gallon of the test blanket wash much more, more, the same, less, or much less?**

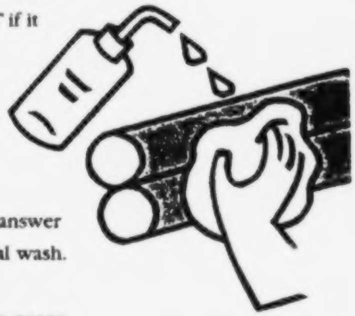
The most obvious difference between two blanket washes is the cost to buy them. Compare the cost per gallon of your normal wash to the test wash. Answer "much more" if the test wash costs twice as much as your normal wash or "much less" if it is half the price or less. Factor in dilution ratios for those washes that are shipped as concentrates.

2 **Amount used per cleaning: Compared to your normal blanket wash, Is the amount of test wash used to clean each blanket much more, more, the same, less, or much less?**

The more wash you use each time you clean a blanket, the more it costs you. Ask press operators how much of the test wash is needed to clean the blanket compared to the amount of normal wash. Answer "much more" if it takes twice as much test wash or "much less" if it takes less than half as much to clean the blanket.

3 **Time to clean a blanket: Compared to your normal blanket wash, Is the time required to clean a blanket with the test wash much more, more, the same, less, or much less?**

Press downtime costs money. If the test wash takes twice as long to clean the blanket, answer "much more". Answer "much less" if the test wash takes only half as long as your normal wash.



Use the Worksheet to Choose a Better Roller Wash Too!

4 **Press operator opinion: Compared to your normal blanket wash, What does the press operator think of the test wash? Is it much worse, worse, the same, better, or much better?**

Ask press operators to compare the test wash to the normal wash on odor, blanket swell, the time required for the press to come back to color, the effort required to use the washes, and any other factors they think are important. Combine these into an overall score for this question.

5 **Hazardous chemicals: Does the test wash contain hazardous chemicals as defined by environmental laws or the Occupational Safety and Health Act (OSHA)?**

Contact the supplier or manufacturer for this information. A variety of environmental regulations apply to hazardous materials because of their potential dangers to people and the environment. Violations may result in large fines. At the very least, using a regulated hazardous chemical may increase compliance costs. Ask your blanket wash supplier if the blanket wash, or its waste, is considered hazardous under any environmental law (such as RCRA, CAA, CERCLA, or EPCRA - Section 2, etc.) or under OSHA. Never mix hazardous and non-hazardous wastes. The hazardous chemicals in a blanket wash, as defined by OSHA, are usually listed in Section 2 of the MSDS form. If this section says "none", your test wash probably does not contain OSHA hazardous chemicals. But beware. The MSDS lists OSHA hazardous chemicals only. The blanket wash may still contain chemicals defined as hazardous by other environmental regulations. If this section is blank, ask your supplier. See **Questions to Ask When You Call Your Blanket Wash Supplier** for more information.

6 Evaporation: Compared to your normal blanket wash, Is the vapor pressure of the test wash much higher, higher, the same, lower, or much lower?

See MSDS Section 3 - Physical and Chemical Characteristics - for vapor pressure information. Vapor pressure is a measurement of how quickly a chemical evaporates. The higher the vapor pressure of a blanket wash, the quicker it evaporates. If a blanket wash has hazardous ingredients, they can evaporate into the air in your shop, enter the lungs of your workers, and pollute the surrounding environment. If the vapor pressure of your test wash is less than the wash you are currently using, it may evaporate less in your shop. Vapor pressure is usually expressed in mmHg. Call your supplier if the vapor pressures of the washes are expressed in different units. 10 mmHg is usually a regulatory cut-off, but the lower the vapor pressure the better.

If the test wash vapor pressure (in mmHg) is	Score
More than ten times higher	Much higher
Between ten times and 1.5 times higher	Higher
Between 1.5 times higher and 1.5 times lower	Same
Between 1.5 times and ten times lower	Lower
More than ten times lower	Much lower

7 Environmental Regulations and Worker Health: Compared to your normal blanket wash, Is the percentage VOCs of the test wash much higher, higher, the same, lower, or much lower?

Contact supplier or manufacturer for this information. The amount of Volatile Organic Compounds (VOCs) in your blanket wash can affect your costs of complying with environmental regulations, especially Clean Air Act regulations on emissions from your shop. VOCs contribute to lower level smog and may have health concerns. If the test blanket wash has low or no VOC content, your environmental compliance responsibilities (and costs) may be lowered and the health and safety of your employees may be improved. You might need to contact your blanket wash manufacturer for this item (see **Questions to Ask When You Call Your Blanket Wash Supplier** for more information). Score "much higher" if the percentage VOC content of the test wash is two times or more that of the normal wash or "much lower" if the percentage VOC content of the test wash is two times or more lower. Score "same" if within 10%.

8 Flammability: Compared to your normal blanket wash, Is the flash point of the test wash much higher, higher, the same, lower, or much lower?

See MSDS Section 4 - Fire and Explosion Data - for flash point information. The flash point is one measurement of the temperature at which a chemical will ignite. In general, as flash point increases, so does safety. Even though the minimum flash point for flammability is 100° F and for hazardous wastes is 140°F, the higher the flash point the better. A less flammable chemical may save you money on your property insurance as well as exempt you from costly storage and record keeping requirements of environmental and safety regulations such as RCRA and OSHA. Contact your insurance underwriter for a reappraisal to determine the cost savings from using a less flammable blanket wash at your shop. If the flash point of the test wash is two times lower than the normal wash, mark "much lower" on the worksheet. If the flash point of the test wash is more than two times higher, mark "much higher" on the worksheet. Score "same" if within 15°F .

9 Other: Compared to your normal blanket wash, How does the test wash compare on any other factors? Much worse, worse, same, better, or much better?

Compare the performance of the test wash to your normal wash on any other factors important to your shop. Some examples include acceptability of wash to commercial laundry, corrison of press parts, wash availability, dilution, and availability of recycled containers.

The Hidden Costs of Your Blanket Wash

The environmental, health, and safety costs of blanket washes are often hidden. If your test wash is less harmful to your workers or the environment, or is less flammable than your current blanket wash, you may save money by using it even if it costs more per gallon. Potential savings include:

⇒ Decreased regulatory costs (such as disposal costs, pollution control equipment, permitting, permitting fees, training, fines)

⇒ Improved worker health and safety

⇒ Decreased insurance costs (such as workers compensation, fire, and liability)

⇒ Other decreased costs (such as energy)

Why a Worksheet?

The worksheet provided with this bulletin gives you a place to keep information about the washes you try out at your shop. Make extra copies of the blank worksheet and record nformation about each blanket wash you test. After trying a variety of washes, you can use he completed worksheets to compare them and find the one that is best for your shop.

he worksheet is not a cientific evaluation and nay not cover every potential ost. If a test wash scores ignificantly better than our normal wash, this neans the test wash might e a better choice, but oes not guarantee it.

Choosing a Better Wash — An Example

By testing a variety of washes you may be able to find one that is cheaper to use and better for the environment. During the DfE Lithography Project (see page 6 for more information), a vegetable ester wash was found that worked well and cost less than a petroleum-based wash. Cost per wash was calculated based on price per gallon, time required to wash a blanket, number of towels, and amount used. Results showed the vegetable ester wash was cheaper to use per blanket than the petroleum-based wash at one facility, but was more expensive at another facility. While savings may be even greater when factors such as those on the worksheet are also considered, these mixed results show how important it is to evaluate products in your own facility.

Use the Worksheet to Choose Other Chemicals for Your Shop

The nine worksheet questions can be easily adapted to compare other chemicals, such as roller washes, you test in your shop. These nine questions are important to consider when making any chemical decisions for your facility.

What You Can Do To Compare Blanket Washes

llow the checklist below when testing different blanket washes:

Test Blanket Wash for a Set Amount of Time:

- ☐ **Discuss blanket wash tests with press operators**
- ☐ **Set a trial period of one or two weeks with press operators**
- ☐ **Record major observations during test period**

ollect Information from:

- ☐ **Press Operators**
- ☐ **Material Safety Data Sheets**
  - ➔ **Vapor pressure information from MSDS Section 3**
  - ➔ **Flash point information from MSDS Section 4**
- ☐ **Blanket Wash Supplier**
  - ➔ **Percentage VOC content**
  - ➔ **Is blanket wash considered hazardous under environmental regulations or OSHA?**

omplete Worksheet:

- ☐ **Enter each score in worksheet column**
- ☐ **Add scores for final result**

omplete Evaluation:

- ☐ **Does the final result indicate potential improvement?**
- **Are there other benefits or costs of the test wash that are not on the worksheet?**

Don't Give Up

Keep in mind that the process of choosing a better blanket wash will require some experimentation and an open mind. Not every blanket wash will work well at your shop right away, but some may work better as press operators become more comfortable with them. For this reason, allow a set period of time for trying a blanket wash, and stick to it. For more ideas on cost saving ways to reduce pollution and waste at your facility, see other Design for the Environment (DfE) Bulletins for the Lithographic Industry.

Questions to Ask When You Call Your Blanket Wash Supplier

To complete the worksheet you will need to ask your supplier some important questions: **(Some blanket wash manufacturers may supply this information on the MSDS, but they are not required to do so.)**

1 Does the blanket wash contain chemicals deemed hazardous under any environmental statute or OSHA?

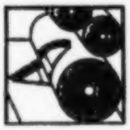
2 What is the percent Volatile Organic Compound (VOC) content of the blanket wash?

3 What is the Vapor Pressure of the wash in mmHg?

About the Design for the Environment Lithography Project

The goal of the Design for the Environment (DfE) Lithography Project is to provide lithographers with information that can help them design an operation which is more environmentally sound, safer for workers, and more cost effective.

Concentrating on the process of blanket washes, the partners of the DfE Lithography Project, in a voluntary cooperative effort, evaluated 37 different blanket wash products. Information was gathered on the performance, cost, and health and environmental risk trade-offs of the different types of substitute blanket wash. For more details on the evaluations, please refer to the booklet, *Evaluating Blanket Washes: A Guide For Printers*.



In addition to the Lithography Project, similar DfE projects are currently underway with both the screen printing and flexography industries.

To obtain additional copies of this or other bulletins and case studies, or for more information about EPA's Design for the Environment Program contact:

EPA's Pollution Prevention Information Clearinghouse (PPIC)
U.S. EPA
401 M Street, SW (3404)
Washington, DC 20460

Phone: (202) 260-1023
Fax: (202) 260-0178
E-mail: ppic@epamail.epa.gov
DfE Web page: http://es.inel.gov/dfe

Recycled/Recyclable
Printed with Soy/Canola Ink on paper that contains at least 50% recycled fiber.

APPENDIX 8
Chemical Purchasing Authorization Form

Use this form to detail information about a new material *before* bringing it into your facility.

General Information Date ____________

Name of the material/product ______________________________

Name of the supplier ______________________________

Telephone number ______________

Plant Use

Ordered by ______________ Quantity ______________

Use ______________________________

____

Occupational Data

WHMIS classification[1]

	Class	Division	Subdivision
Toxicity	____	____	____
Flammability	____	____	____
Reactivity	____	____	____
Health	____	____	____

Environmental Data

Point or discharge (yes/no) air ____ water ____ waste ____

Air emissions[2] %VOC[3] ________ odour ______________________

Wastewater[2] - characteristics[4] ______________________________

Waste[2] - waste class ______ TDG class ____ Packing Group ______ PIN ____

Handling/Storage Requirements

Storage ______________________________

Handling ______________________________

Authorization

Purchasing Name ______________ *Environmental* Name ______________

Signature ______________ Signature ______________

Notes:
[1] MSDS must be attached to this form
[2] Complete this only if you answered *Yes* to "Point of discharge"
[3] VOC is volatile organic compound (volatiles)
[4] For example, flammable, corrosive, etc.

APPENDIX 9
Common Chemical Product Management (1999)

(updated from Nova Scotia Printing Industries Association's *Environmental Management Manual and Resource Guide* (Jacques Whitford Environmental Limited, 1995))

This section details typical chemical products used by printers throughout Atlantic Canada. Information is broken into product usage, typical product ingredients, handling and training, storage, disposal and transportation related issues. **Chemicals that are listed on the National Pollutant Release Inventory (NPRI) are highlighted in bold.** Printers should reduce or eliminate the use of products that contain NPRI chemicals at their facility.

Description **Page**

Pre-Press

Lithographic Developer 9-2
Photographic Fixer 9-3
Plate Developer and Additives 9-4

Printing

Fountain Solutions and Additives (flammable formulations) 9-5
Fountain Solutions and Additives (non-flammable formulations) 9-6
Anti-Set Off Powders 9-6
Spray Adhesives 9-7
Plate Finishing and Storage Gum 9-7
Alcohol (Solvent) Based Ink 9-8
Vegetable (Soya) Based Inks 9-9
Oil Based Inks 9-10
Moisture Set (Glycol) Inks 9-11
Water Based Inks 9-12

Maintenance

Blanket and Roller Washes (Flash point under 60°C) 9-13
Blanket and Roller Washes (Flash point above 60°C) 9-14
Scratch Remover 9-15

Not all chemicals used by commercial printers are discussed. Those chosen for a detailed discussion were selected in consultation with industry representatives because of relatively large volumes used or particular environmental concerns. The format and product description found in the tables are based on *Management Guide to a Safe Environment* (OPIA 1995).

Chemicals used in printing plants on a daily basis which are not included in the following tables may include, but not limited to the following:

- Black and White Developer
- Phototypesetting Developer
- PMT Activator
- Opaque
- Film Cleaners
- Systems Cleaner Neutralizer
- Ink Additives
- Anti-static Solutions
- Anti-skin Solutions
- Padding Compounds
- Spray Adhesives
- Plate Baking solutions
- Methyl Ethyl Ketone
- Developer System Cleaners
- Rubber Rejuvenator
- Blanket Mend
- Wax

Lithographic Developer (tank overflow waste)

Product	**Comments**
Product Use	Developing solution for lithographic film.
Typical Product Ingredients	Aqueous solution may contain: carbonate salts, **diethanolamine, hydroquinone**, sodium borate, sodium formaldehyde bisulfite, sodium/potassium sulfite, and sodium/potassium hydroxide.
Handling and Training	Controlled product under WHMIS. Wear splash-proof goggles and neoprene gloves. May cause allergic skin reaction. Causes skin, eye, and respiratory tract irritation upon contact. Provide WHMIS and TDG training, and report spills in excess of 5L.
Disposal Procedure	Wash water containing developer constituents must meet the local Model Sewer Discharge By-law (MSDB) limits before sending to sanitary sewer. • pH range 5.5-9.5 (HRM 5.5-10.5; Saint John, NB 6.0-9.5) • BOD limit 300 ppm (Saint John, NB 400 ppm) Spent solutions exceeding any of the parameters that are identified in MSDB may be hauled off-site by a qualified hazardous waste carrier. ***Consult your local MSDB.***
Disposal Legislation	Consult your local town/city by-laws for variations to MSDB.
Storage	Store in well ventilated area. List concentrate solution on hazardous material inventory list. If quantities stored exceed 1000 l, submit plans and specifications of storage facility to Department of Environment (DOE). Include type and quantities of material stored.
Storage Legislation	Workplace Hazardous Materials Information System Regulations (WHMIS) under Occupational Health and Safety Act .
Off-site Transportation	Dangerous Goods Transportation Act: corrosive Liquid, N.O.S., UN 1760, Class 8, Packing Group II

Photographic Fixer (working tank or overflow)

Product	**Comments**
Product Use	Black and white film and paper fixer.
Typical Product Ingredients	Aqueous solution may contain: **aluminum sulphate**, acetic acid, sodium acetate, sodium bisulphate, ammonium/sodium thiosulphate, silver thiosulphate, sodium sulphite, **aluminium chloride**.
Handling and Training	Controlled product under WHMIS. Wear splash-proof goggles, neoprene gloves, and neoprene apron (corrosive to eyes; skin irritant upon contact). Provide WHMIS and TDG training, and report spills in excess of 5L.
Disposal Procedure	After de-silvering, solution is typically sent to sanitary sewer via drain. Usual methods of silver recovery include electrolytic and chemical recovery cartridge. Solution may have to be neutralized and meet the local MSDB limits before sending to drain. **Check your local MSDB**. Washwater containing fixer must also meet all MSDB limits before sending to drain. Other disposal techniques: Distillation: Liquid is removed as distilled water, leaving a small quantity of solid waste. Waste must be handled by a registered hazardous waste carrier. Evaporation: Liquid is removed to air, leaving a small quantity of semi-dry sludge. If the evaporation exhaust is vented to outside air limits should be reviewed by DOE. VOC recapture may be required using activated carbon. Off-Site Cartage: By a registered hazardous waste disposal contractor.
Disposal Legislation	Model Sewer Discharge By-law: • pH range 5.5-9.5 (HRM, NS 5.5-10.5; Saint John, NB 6.0-9.5) • BOD limit 300 ppm (Saint John, NB 400 ppm) Silver limit 2 ppm ; Sulphate limit 1500 ppm; iron limit 50 ppm - **Check your local MSDB.** Note: It is likely that iron limit will be exceeded if chemical recovery cartridges are used for de-silvering. Consult local town/city by-laws for variations to MSDB.
Storage	List concentrate solution in hazardous material inventory list. Store in a well ventilated area. Keep away from oxidizing materials and strong acids.
Storage Legislation	Workplace Hazardous Materials Information System Regulations (WHMIS) under Occupational Health and Safety Act .
Off-site Transportation	De-silvered working tank solutions and overflow generally not subject to Transportation of Dangerous Goods Act. If the fixer has not been desilvered it is regulated as Leachable Toxic Waste, (L28) NA 9600, Class 9.3, Packing Group III.

Plate Development and Additives	
Product	**Comments**
Product Usage	**For development of positive lithographic printing plates.**
Typical Product Ingredients	Aqueous based solution which may contain disodium phosphate, glycerine, potassium hydroxide, potassium/sodium metasilicate, and sodium EDTA.
Handling and Training	Controlled product under WHMIS. Wear splash-proof goggles and neoprene gloves. Provide WHMIS and TDG training, and report Spills of concentrate solution in excess of 5L.
Disposal Procedure	Must be neutralized and meet the local MSDB limits before sending to sanitary sewer. If the spent solutions exceed the MSDB limits, it must be hauled off-site by a registered hazardous waste carrier. Under TDG, spent solution is classified as a liquid industrial waste; company must be registered as a waste generator.
Disposal Legislation	Model Sewer Discharge By-law: • pH range 5.5-9.5 (HRM, NS 5.5-10.5; Saint John, NB 6.0-9.5) • BOD limit 300 ppm (Saint John, NB 400 ppm) Consult local town/city by-laws for variations to MSDB.
Storage	List product in hazardous material inventory list. Store in dry area. Do not store with acids
Storage Legislation	Workplace Hazardous Materials Information System Regulations (WHMIS) under Occupational Health and Safety Act .
Off-site Transportation	Transportation of Dangerous Goods Act: Corrosive Liquids, N.O.S. (Sodium Metasilicate), UN 1760, Class 8, Packaging Group II.

Fountain Solutions and Additives (Flammable Formulations)	
Product	**Comments**
Product Use	To keep non-image areas of printing plate desensitized and clean.
Typical Product Ingredients	A mixture which may include **2-Butoxy ethanol**, glycerine, **ethylene glycol**, monobutyl ether and **isopropanol**.
Handling and Training	Controlled product under WHMIS. Wear splash-proof goggles and neoprene gloves. Causes skin and eye irritation upon contact. Provide WHMIS and TDG training, and report Spills in excess of 100 litres.
Disposal Procedure	Spent solutions must be hauled off-site by a qualified hazardous waste hauler.
Disposal Legislation	Model Sewer Use By-Law: No wastes containing flammable components may be discharged into sewers, even if it is not defined flammable or explosive per TDG. Spent solution is classified as an ignitable waste and company must register as a waste generator.
Storage	Include in hazardous materials inventory list. Store in a cool, dry place away from sunlight and high heat sources. If stored quantities exceed 10000 l: Submit plans, specifications of storage facility to DOE, include type and quantities of material.
Storage Legislation	Workplace Hazardous Materials Information System Regulations (WHMIS) under Occupational Health and Safety Act.
Off-Site Transportation	Generally regulated under the Dangerous Goods Transportation Act: Flammable Liquids, N.O.S., PIN 1993, Class 3.3, Packing Group III.

Fountain Solutions and Additives Non-Flammable Formulations	
Product	**Comments**
Product Usage	To keep non-image area of printing plate desensitized and clean
Typical Product Ingredients	A mixture which may include **2-Butoxy ethanol**, citric acid, diethylene glycol ethyl ether, dipropylene glycol, and **ethylene glycol**, magnesium nitrate and propylene glycol.
Handling and Training	Wear splash goggles and neoprene or nitrile gloves. Exposure to mixture may cause irritation of eyes, skin, nose, throat.
Disposal Procedure	Solutions must be neutralize with weak alkaline solution and meet local MSDB limits before sending to sanitary sewer via drain. The solutions that does not meet the local MSDB limits must be hauled off-site by a registered waste carrier. Spent solutions are classified as liquid industrial waste. Company must register as a waste generator.
Disposal Legislation	Model Sewer Use By-Law: • pH range 5.5-9.5 (HRM, NS 5.5-10.5; Saint John, NB 6.0-9.5) • BOD limit 300 ppm (Saint John, NB 400 ppm)
Storage	Store in a cool, dry area away from sunlight and high heat sources. Keep from freezing. Must be listed on hazardous material inventory.
Storage Legislation	Workplace Hazardous Materials Information System Regulations (WHMIS) under Occupational Health and Safety Act .
Off-site Transportation	This mixture is not regulated by Transportation of Dangerous Goods Transportation Act.

Anti Off-Set Powders	
Product	**Comments**
Product Usage	Eliminates ink transfer between pages.
Typical Product Ingredients	No hazardous ingredients.
Handling and Training	No personal protective equipment required. Produces only minor irritation to skin and eyes.
Handling and Training Legislation	None applicable
Disposal Procedure	Dispose into non-hazardous refuse or collect waste and send to a licensed waste treatment facility.
Disposal Legislation	None applicable
Storage	Store in a cool, dry area away from sunlight and high heat sources.
Storage Legislation	None applicable
Off-Site Transportation	Not regulated under Dangerous Goods Transportation Act.

Spray Adhesives	
Product	**Comments**
Product Usage	General Adhesives used in a variety of pressroom jobs
Typical Product Ingredients	A solvent based mixture which may include **cyclohexane**, **n-hexane**, dimethyl ether, isobutane and propane.
Handling and Training	Controlled product under WHMIS. Wear splash goggles and neoprene or nitrile gloves. Extremely flammable. Do not use in confined spaces.
Disposal Procedure	Dispose of empty cans in sanitary landfill. Under DGMR in NS, an ignitable compressed gas is classified as ignitable waste. Partially used containers of spray adhesive must be hauled off-site by a licensed hazardous waste carrier. Company must register as a waste generator. NB, NF and PEI, consult your local DOE (Appendix 1).
Disposal Legislation	Dangerous Goods Management Regulations (NS), Waste Material Disposal Act (NF), Waste Resource Management Regulations (PEI) and Solid Waste Resource Management Regulations (NB)
Storage	Must be listed on the hazardous materials inventory . Do not store at temperature above 49°C.
Storage Legislation	Workplace Hazardous Materials Information System Regulations (WHMIS) under Occupational Health and Safety Act.
Off-Site Transportation	May be regulated under Dangerous Goods Transportation Act.: Aerosols, PIN 1950, Class 2.1 Packing Group X.

Plate Finishing and Storage Gum	
Product	**Comments**
Product Usage	To protect printing plates from physical damage
Typical Product Ingredients	An aqueous solution which may contain benzyl alcohol, dextrine, **ethylene glycol**, gum arabic, polyvinylpyrrolidone, potassium phosphate ester, sodium bisulfate, sodium hexametaphosphate and starch.
Handling and Training	Wear splash goggles, neoprene gloves, and a neoprene apron. Contact with eyes and skin will cause irritation Prolonged contact with some plate finishers may cause irritation or dermatitis in some individuals.
Disposal Procedure	Must be neutralized and meet the criteria specified in MSDB before sending to sanitary sewer via drain. If the solution does not meet the criteria specified in MSDB, it must be hauled off-site by a registered hazardous waste carrier. Solutions are classified as hazardous liquid waste; Company must register as a waste generator.
Disposal Legislation	Model Sewer Discharge By-law: • pH range 5.5-9.5 (HRM, NS 5.5 - 10.5; Saint John, NB 6.0-9.5) • BOD limit 300 ppm (Saint John, NB 400 ppm)
Storage	Must be listed on the hazardous materials inventory. Keep the container tightly closed and store in a well ventilated area.
Storage Legislation	Workplace Hazardous Materials Information System Regulations (WHMIS) under Occupational Health and Safety Act .
Off-Site Transportation	Not regulated under the Dangerous Goods Transportation Act.

Alcohol (Solvent) Based Ink

Product	**Comments**
Product Usage	Printing Ink
Typical Product Ingredients	A solvent based mixture which may contain **dibutyl phthalate, dioctyl phthalate**, ethanol, ethyl acetate, **isopropanol**, **methanol,** n-propanol, n propanol acetate, nitrocellulose.
Handling and Training	Controlled product under WHMIS. Wear splash goggles and nitrile or neoprene gloves. Strong potential that some inks of this family cause teratogenic and fetotoxic effects in animals. Take precautions against static discharge. Provide TDG and WHMIS training, and report Spills in excess of 100 litres.
Disposal Procedure	**Used ink** must be hauled off-site by a registered hazardous waste carrier. Company and waste must be registered with local DOE. Some recovery and recycling equipment and techniques are available. Contact your supplier for alternative disposal methods. Obtain information in writing.
Disposal Legislation	Model Sewer Use By-Law: • No wastes containing flammable components may be discharged into sewers. • Solid or viscous substances which are capable of obstructing the sewer may not be discharged. • Waste containing dye or colouring material may not be discharged. Under DGMR in NS, **used ink** is classified as ignitable waste. NB, NF and PEI, consult your local DOE (Appendix 1). Ingredients of some inks may be prohibited from landfill. Check MSDS or call supplier.
Storage	Must be listed on the hazardous materials inventory. Store at room temperature away from sources of ignition.
Storage Legislation	Workplace Hazardous Materials Information System Regulations (WHMIS) under Occupational Health and Safety Act.
Off-Site Transportation	May be regulated under Dangerous Goods Transportation Act: Flammable Liquids N.O.S., PIN 1993, Class 3.2, Packing Group II.

	Vegetable (Soya) Based Inks
Product	**Comments**
Product Usage	Printing Inks
Typical Product Ingredients	Oil based mixture containing no hazardous products.
Handling and Training	Wear splash goggles and gloves.
Handling and Training Legislation	Not controlled under WHMIS, DGMR, or TDG.
Disposal Procedure	Store used ink in a covered container. **Used ink** should be hauled off-site by a registered hazardous waste carrier. Waste carrier company and waste must be registered with local DOE. Heat set and cold set inks with no drying oils may be recyclable. Contact your supplier for alternative disposal methods. Obtain information is writing.
Disposal Legislation	Model Sewer Disposal By-Law: • Solid viscous substances which are capable of obstructing the sewer may not be discharged. • Waste containing dye or colouring material may not be discharged. Under DGMR in NS, **used ink** is classified as a liquid industrial waste. Company must register as a waste generator. NB, NF and PEI, consult your local DOE (Appendix 1). Ingredients of some inks may be prohibited from landfill. Check MSDS or call supplier.
Storage	Store in dry, well ventilated conditions when not in use.
Storage Legislation	Workplace Hazardous Materials Information System Regulations (WHMIS) under Occupational Health and Safety Act.
Off-Site Transportation	Not regulated by Dangerous Goods Transportation Act.

	Oil Based Ink
Product	**Comments**
Product Usage	Printing Ink
Typical Product Ingredients	An oil mixture containing carbon black and hydrotreated middle distillate.
Handling and Training	Wear splash goggles and neoprene or nitrile gloves. Report spills in excess of 100 litres. Provide WHMIS and TDG training.
Disposal Procedure	Store used ink in a covered container. **Used ink** should be disposed of by a registered hazardous waste contractor. Heat set and cold set inks with no drying oils may be recycled. Consult your ink supplier for alternative disposal options. Obtain information in writing.
Disposal Legislation	Model Sewer Discharge By-Law: • Solid viscous substances which are capable of obstructing the sewer may not be discharged. • Waste containing dye or colouring material may not be discharged. Under DGMR in NS, **used ink** is classified as liquid industrial waste; company must register as a waste generator. Can be hauled off-site by a registered hazardous waste carrier. NB, NF and PEI, consult your local DOE (Appendix 1). Ingredients of some inks may be prohibited from landfill. Check MSDS or call supplier.
Storage	Store in dry, well ventilated area. List ink on the hazardous materials inventory. Register storage facility if inventory quantities exceed 10,000 litres.
Storage Legislation	Workplace Hazardous Materials Information System Regulations (WHMIS) under Occupational Health and Safety Act.
Off-Site Transportation	May be regulated under Dangerous Transportation Goods Act. Petroleum Distillates N.O.S., PINS 1268. Class 3.3, Packing Group III. Check MSDS of specific ink to be shipped.

Moisture Set (Glycol) Ink	
Product	**Comments**
Product Usage	Printing Ink
Typical Product Ingredients	**Ethylene glycol**, monoethanolamine
Handling and Training	Controlled product under WHMIS. Wear splash goggles and neoprene or nitrile gloves. This product can be a skin irritant, a severe eye irritant and may be cause corneal damage. An eyewash fountain should be available. Provide WHMIS and TDG training, and report Spills in excess of 100 litres.
Disposal Procedure	Store used ink in a covered, correctly labeled container. **Used ink** should be hauled off-site by a registered waste hauler.
Disposal Legislation	Model Sewer Discharge By-Law: • Solid or viscous substances which are capable of obstructing the sewer may not be discharged • Waste containing dye or colouring material may not be discharged. Under DGMR in NS, **used ink** is classified as a liquid industrial waste. Company must register as a waste generator. NB, NF and PEI, consult your local DOE (Appendix 1). Ingredients of some inks may be prohibited from landfill. Check MSDS or call supplier.
Storage	Store in a dry and well ventilated area. List ink on the hazardous materials inventory. Register storage facility if inventory exceeds 1000 kg or 1000 litres.
Storage Legislation	Workplace Hazardous Materials Information System Regulations (WHMIS) under Occupational Health and Safety Act.
Off-Site Transportation	May be regulated under Dangerous Goods Transportation Act.: monoethanolamine Solutions, PIN 2491, Class 8, Packing group III. Check MSDS of specific ink to be shipped.

Water Based Inks	
Product	**Comments**
Product Usage	Printing ink
Typical Product Ingredients	An aqueous mixture containing **isopropanol**, morpholine.
Handling and Training	Controlled product under WHMIS. Wear splash goggles and natural rubber gloves. Moderate to severe irritant to skin, eye, nose, throat, and respiratory tract. May be harmful or fatal if swallowed. If ventilation is inadequate, use a organic vapour respirator. Portable containers used for dispensing flammable liquids in a workplace must be suitable for worker safety and have a spring-locked cap and flame arrester. Provide WHMIS and TDG training, and report Spills over 100 litres.
Disposal Procedure	Store used ink in a covered container. Used ink should be hauled off-site by a registered waste hauler.
Disposal Legislation	Model Sewer Use By-Law: • No wastes containing flammable components may be discharged into sewers. • Solid or viscous substances which are capable of obstructing the sewer may not be discharged. • Waste containing dye or colouring material may not be discharged. Under DGMR in NS, **used ink** is classified as ignitable waste. NB, NF and PEI, consult your local DOE (Appendix 1). Ingredients of some inks may be prohibited from landfill. Check MSDS or call supplier.
Storage	Must be listed on the hazardous materials inventory (DGMR). Store at room temperature away from heat and all ignition sources. Incompatible with acids and oxidizing agents.
Storage Legislation	Workplace Hazardous Materials Information System Regulations (WHMIS) under Occupational Health and Safety Act.
Off-Site Transportation	May be regulated under Dangerous Goods Transportation Act.: Isopropanol, PIN 1219, Class 3.2, Packing Group II. Check MSDS of specific ink to be shipped.

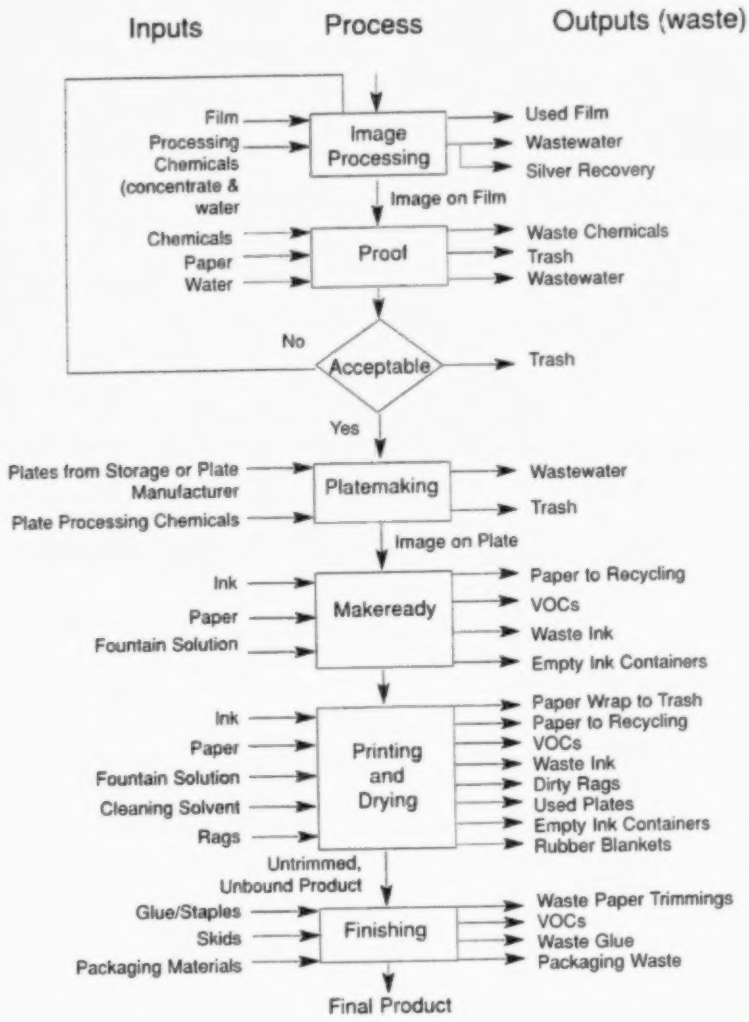
Blanket and Roller Washes Flashpoint Under 60°C

Product	Comments
Product Usage	To remove ink and water soluble contaminants from blanket and rollers.
Typical Product Ingredients	**Ethylene glycol**, petroleum distillates, glycol ether, **isopropanol**, and petroleum **naptha**.
Handling and Training	These products typically controlled under WHMIS. Wear splash goggles and neoprene or nitrile gloves. When dispensing liquid use adequate grounding since this product can be a serious static accumulator. Provide WHMIS and TDG training, and report spills in excess of 100 litres.
Disposal Procedure	Spent solutions must be hauled off-site by a registered hazardous waste hauler. Company must register as a waste generator.
Disposal Legislation	Model Sewer Use By-Law: No wastes containing flammable components may be discharged into sewers. Empty containers may contain flammable or hazardous residues. Under DGMR in NS, **used ink** is classified as ignitable waste. NB, NF and PEI, consult your local DOE (Appendix 1). Ingredients of some inks may be prohibited from landfill. Check MSDS or call supplier.
Storage	Must be listed on the hazardous materials inventory. Store in a cool, dry area away from sunlight and high heat sources. Avoid contact with oxidizing agents. Obtain instructions in writing.
Storage Legislation	Workplace Hazardous Materials Information System Regulations (WHMIS) under Occupational Health and Safety Act.
Off-Site Transportation	Bulk shipments regulated under Dangerous Goods Transportation Act. Petroleum distillates, N.O.S. (Naptha) PIN 1268., Class 3.3, Packing Group III.

Blanket and Roller Washes Flashpoint Over 60°C	
Product	**Comments**
Product Usage	To remove ink and contaminants from blanket and rollers.
Typical Product Ingredients	A petroleum distillate such as stoddard solvent and light aromatic solvents such as **naphtha**.
Handling and Training	Typically controlled under WHMIS. Use splash goggles and nitrile or neoprene gloves. Contact can cause sever irritation of eyes, and some irritation of skin and respiratory tract. Ground container when transferring product. Provide WHMIS training, and report spills in excess of 100 litres.
Disposal Procedure	Model Sewer Discharge By-law strictly prohibit the discharge of any quantity of naptha, benzene or any other flammable material into sewer systems. Have waste blanket wash solutions removed from site by a registered waste contractor. Company must register as a hazardous waste generator. Under DGMR in NS, **spent solution** is classified as a liquid industrial waste. NB, NF and PEI, consult your local DOE (Appendix 1).
Disposal Legislation	Model Sewer Use By-Law
Storage	Must be listed on the hazardous materials inventory. Store in a cool, dry area away from sunlight and high heat sources. Avoid contact with strong oxidizing materials. Empty containers may contain flammable vapours or hazardous residue; clean empty container prior to disposal.
Storage Legislation	Workplace Hazardous Materials Information System Regulations (WHMIS) under Occupational Health and Safety Act.
Off-Site Transportation	Not regulated under Transportation of Dangerous Goods Act according to various MSDS information.

Scratch Remover	
Product	**Comments**
Product Usage	To remove scratches on film.
Typical Product Ingredients	An aqueous solution containing stoddard solvent, sodium silicate, potassium hydroxide.
Handling and Training	Controlled under WHMIS. Wear splash goggles and nitrile or neoprene gloves. Corrosive causes eye, skin and upper respiratory tract irritation upon repeated exposure. Provide WHMIS training and report Spills over 100 litres.
Disposal Procedure	This solution cannot be sent to sanitary sewer because it exceeds pH range and is defined as an ignitable waste. **Spent solutions** must be hauled off-site by a licensed hazardous waste carrier.
Disposal Legislation	Model Sewer Discharge By-Law: • pH range 5.5-9.5 (HRM, NS 5.5-10.5; Saint John, NB 6.0-9.5) • Ignitable waste in any amount may not be discharged to sanitary sewer
Storage	Must be listed on the hazardous materials inventory. Store in cool dry place away from sunlight and heat sources. This product should not be stored with acids.
Storage Legislation	Workplace Hazardous Materials Information System Regulations (WHMIS) under Occupational Health and Safety Act.
Off-Site Transportation	Not regulated under Dangerous Goods Transportation Act according to various MSDS information.

APPENDIX 10
Flowsheet Showing Inputs and Outputs From a Typical Lithographic Printing Operation


Inputs
Process
Outputs (waste)
Film
Processing Chemicals (concentrate & water
Image Processing
Used Film
Wastewater
Silver Recovery
Image on Film
Chemicals
Paper
Water
Proof
Waste Chemicals
Trash
Wastewater
No
Acceptable
Trash
Yes
Plates from Storage or Plate Manufacturer
Plate Processing Chemicals
Platemaking
Wastewater
Trash
Image on Plate
Ink
Paper
Fountain Solution
Makeready
Paper to Recycling
VOCs
Waste Ink
Empty Ink Containers
Ink
Paper
Fountain Solution
Cleaning Solvent
Rags
Printing and Drying
Paper Wrap to Trash
Paper to Recycling
VOCs
Waste Ink
Dirty Rags
Used Plates
Empty Ink Containers
Rubber Blankets
Untrimmed, Unbound Product
Glue/Staples
Skids
Packaging Materials
Finishing
Waste Paper Trimmings
VOCs
Waste Glue
Packaging Waste
Final Product

Adapted from U.S. Environmental Protection Agency *Guides to Pollution Prevention — The Commercial Printing Industry* (EPA/625/7-90-006), August 1990.

APPENDIX 11 EcoLogo Information

EcoLogo^M
products *and* services

ENVIRONMENTAL CHOICE · CHOIX ENVIRONNEMENTAL ·

Canada's Symbol of Environmental Responsibility

The EcoLogo® is the recognized seal of approval of the Environmental Choice® Program, Canada's only national and comprehensive eco-labelling program.

The Environmental Choice Program was established in 1988 to encourage the demand for and supply of products and services that are more environmentally responsible, and to help consumers make informed choices in favour of the environment. Today, the EcoLogo can be found on a broad range of household, commercial and industrial products and services.

All EcoLogo products represent good value.

A Higher Environmental Standard

All consumer products and services have varying degrees of environmental impact, but those certified by the Environmental Choice Program help reduce the burden on the environment.

Here's how EcoLogo certification works.

Stringent Environmental Criteria — The Environmental Choice Program establishes stringent environmental criteria against which products and services are assessed. The development of criteria for any given product begins with research on the environmental impact during production, transportation, use and disposal. Guideline criteria are established in consultation with industry, environmental groups, and independent experts. The process of approving guidelines also includes a public review period.

Guidelines are based on the latest scientific, technical and market information available, and allow only environmentally preferable products and services to be certified. Today, the Program counts over 60 product- and service-specific guidelines.

Environment Canada Environnement Canada Canada

APPENDIX 11 EcoLogo Information (continued)

If guidelines have yet to be developed for a particular category, a panel of independent experts relies on existing guidelines, up-to-date research and life-cycle review to establish certification criteria for products or services. This way, unique products, as well as leading-edge technologies and services, can also be evaluated to determine if they are indeed environmental leaders in their fields.

Third-party Certification — In order to have a product or service certified, companies must demonstrate that their product or service meets the guideline or independent panel criteria. Generally, they must be made or offered in a way that uses less energy, reduces harmful emissions and by-products, uses recycled materials, or can be re-used.

Testing and verification against specific environmental criteria is conducted on a cost-recovery basis by qualified auditors to ensure that products and services comply with our stringent environmental, performance and quality control requirements.

Company Licensing — Companies whose product or service successfully passes the testing and verification stage are licensed to use the EcoLogo. Once licensed, companies can use the EcoLogo on packaging and in conjunction with promotional and marketing activities. They can also participate in the Environmental Choice Program's marketing, media and advertising campaigns, or can partner their own efforts with those of the Program. Annual license fees are charged to participating companies on the basis of certified product or service sales.

The Advantage of EcoLogo Products and Services

- The EcoLogo is the **Government Seal of Approval** on products and services that have been verified as being more environmentally responsible. The EcoLogo and the Environmental Choice Program are owned by the Federal Department of the Environment, which provides considerable marketplace credibility.

- **All EcoLogo Products Offer Guaranteed Performance and Value**. They must meet established industry standards for safety and performance and must stand up to any products in their class in order to bear the EcoLogo.

- Major retailers and specialty shops throughout Canada carry a **Variety of EcoLogo Products and Services**, which can meet consumer needs in such areas as automotive care, cleaning and maintenance, building and renovation, office and school products, and recreational boating. Many other unique products have also been certified to use the EcoLogo.

- EcoLogo products and services are the **Growing Preference of Institutional Buyers and Consumers** because they display a credible mark of environmental leadership. They can trust the EcoLogo because the criteria that stand behind the logo are developed using a transparent, science-based process relying on the latest technical and market information available.

Two out of three Canadians
say they have confidence in
the EcoLogo as a buying guide.

For More Information

If you would like further information on the EcoLogo, the Environmental Choice Program, media and advertising campaigns, certified products and services, or for a free, no obligation estimate on the cost of certifying your product or service, contact us today by calling (613) 247-1900, or mail or fax back this form.

☐ Send me a Certified Products and Services List
☐ Send me Factsheets

____
(if possible specify the product or service type)

☐ Send me information on how to obtain the EcoLogo for my product or service

____
(if possible specify the product or service type)

☐ Other ________________________

Name

Company/Organization *(if applicable)*

Address

City Province

Postal Code

Telephone

Fax E-Mail

Please send information by ☐ Fax ☐ Mail

Environmental Choice Program
c/o TerraChoice Environmental Services Inc
2197 Riverside Drive Suite 300
Ottawa ON K1H 7X3
(613) 247-1900 Fax (613) 247-2228
Internet ecoinfo@TerraChoice ca

Who is TerraChoice Environmental Services Inc.?

TerraChoice Environmental Services Inc. is an environmental consulting firm which, under an exclusive license agreement, manages and delivers the Environmental Choice Program on behalf of the Federal Department of the Environment.

EcoLogo Paper

APPENDIX 12
Emergency Contacts

Write the names and telephone numbers of people in all the following positions of responsibility.

Position	Contact Person	Business Phone	Home Phone
President/owner			
Plant manager			
Production manager			
1st shift manager			
2nd shift manager			
3rd shift manager			
Environmental issues			
Health and safety issues			
Facility maintenance			
Fire department			
Police			
Department of Environment			
Municipal Spills Reporting			
Spill Contractor			

24 Hour Emergency Hotline 1-800-565-1633

Other Key Employees

Person responsible for employee training ______________________________

Members of the joint health and safety committee ______________________________

______________________________ ______________________________

______________________________ ______________________________

People responsible for answering the telephone:1st shift ______________________________

2rd shift ______________________________ 3nd shift ______________________________

10 Basic Steps to Spill Response

1. Get away
2. Identify what you saw
3. Get help
4. Seal off the area and alert others
5. Look for injuries
6. Identify the hazards
7. Prepare a plan of action
8. Get proper equipment and materials
9. Contain the spill
10. Clean-up the spill

APPENDIX 14
Workplace Hazardous Materials Information System

The following is based on material from Management Guide to a Safe Environment, an OPIA publication (905-564-9411).

The Workplace Hazardous Materials Information System (WHMIS) regulation is designed to protect workers by providing them with vital information about the hazards of materials used in their workplace. The underlying philosophy is that workers have a right to know about the hazards in their workplace so they can take the necessary precautions to protect themselves. These hazards include biological as well as chemical hazards. Because our concern is with only the printing industry, we're going to focus on chemical hazards.

WHMIS is not a single law but rather several laws both federal and provincial. The main purpose of the *federal* WHMIS legislation is to require the suppliers of hazardous materials used in the workplace to provide health and safety information about their products as a condition of sale. The main purpose of the *provincial* WHMIS legislation is to require employers to obtain health and safety information about hazardous materials in the workplace and to pass this information on to workers. WHMIS places hazardous materials into one of eight classifications:

Class A

Compressed gases - pose an explosive danger because these gases are contained under pressure - may cause container to explode if heated in a fire or subject to impact forces

Class B

Flammable and combustible materials - material that will burn (a potential fire hazard) or may burst into flame spontaneously, in air, or release a flammable gas on contact with water vapour - may cause a fire when exposed to heat, sparks, flames or as a result of friction

Class C

Oxidizing materials - pose a fire and/or explosion risk in the presence of flammable or combustible material - amy react violently or cause an explosion when contacting combustible materials

Class D-1

Poisonous and infectious materials - materials causing immediate and serious toxic effects - may be potentially fatal poisonous substance - may be fatal or cause permanent damage if inhaled or swallowed, or entering the body through skin contact

Class D-2

Materials causing other toxic effects - a poisonous substance that may not be immediately dangerous to health - may cause death or permanent damage as a result of repeated exposures over time p amy be a sensitizer (produce chemical allergies) - may cause cancer, birth defects or sterility

Class D-3

Biohazardous infectious material - may cause a serious disease resulting in illness or death

Class E

Corrosive material - caused eye and skin tissue damage upon contact - causes severe tissue damage with prolonged contact - may be harmful if inhaled

APPENDIX 14
Workplace Hazardous Materials Information System

Class F

Dangerously reactive material - is very unstable - may react with water to release a toxic gas - may explode as a result of shock, friction or increase in temperature - may explode if heated when in a closed container - undergoes vigorous polymerization or decomposition

WHMIS has three elements:
1. material safety data sheets,
2. labels, and
3. worker education and training.

Material Safety Data Sheets
The material safety data sheet (MSDS) is a technical bulletin containing all the information known about a given chemical. An employer must have an MSDS for every controlled product in the workplace. MSDSs must be accessible to all employees, must be available in both English and French (if requested), and are valid for three years only.

Labels
All containers of controlled products must have a label identifying the name of the product, hazard information, and a reference to the product MSDS.

Controlled product chemical labels must list:
- product name
- supplier name
- reference to MSDS for more information
- hazard symbols identify its hazard class(es)
- risk phrases describing its hazards
- precautionary handling measures
- first aid steps for chemical exposure

There are two types of labels used: supplier labels and workplace labels. Chemical manufacturers, importers, and suppliers must label all controlled products intended for sale into the Canadian workplace. In addition, the contents must be contained within the distinctive hatch mark WHMIS border. The label must be printed in both English and French.

The employer is responsible for putting a workplace label on the controlled product in the following situations:

- the hazardous material is produced at the employer's workplace (e.g., part A and B is mixed to create a new solution)
- the hazardous material is taken from the original container and placed in a workplace container
- the supplier label is missing or unreadable
- the hazardous material arrived in bulk without a supplier label

The requirements for the workplace label are also spelled out in the WHMIS regulation but the format is not. Your local safety supply company can assist you with labels and some software packages are available to computer generate your labels. Be sure that your labels are appropriate for the plant environment they will be used in. For example blanket wash labels should be resistant to solvents and the blanket wash itself.

Worker Education and Training
Each employer is responsible for providing education and training to every employee who works with or near controlled products. Employees are to be instructed in:

(1) interpreting and using the information found on MSDSs and labels,
(2) procedures for the safe use, storage, handling and disposal of controlled products, and
(3) procedures to be followed in the case of an emergency involving a controlled product.

Since many of the products used in the printing industry are classified as controlled products, the WHMIS legislation applies to these workplaces. This means MSDSs must be available, all controlled products must be labeled, and employees must be trained.

APPENDIX 15 Record of Housekeeping

Area	Housekeeping Issue to Resolve	Date to Start	Target Date to Finish	Person Responsible
Office				
Prepress				
Pressroom				

APPENDIX 15 *Record of Housekeeping (continued)*

Area	Housekeeping Issue to Resolve	Date to Start	Target Date to Finish	Person Responsible
Finishing				
Storage/Warehouse				
Chemical Storage				
Maintenance				
Grounds				
Other				

APPENDIX 16 Containment Tank Criteria

Tank Construction

- Material: single-walled or double-walled steel or fibreglass (to meet petroleum storage standards)
- Capacity: tank to hold the volume of the largest container plus 10 percent of all other containers
- Other: if the tank is steel, the interior should be coated with solvent resistant material

Floor Drain Construction

- Material: should be fabricated from a nonspark material (i.e., nickel/brass alloy)

Drain Line Construction

- Material: schedule 40 steel pipe with threaded or all weld fittings - as with the tank lines, drain lines should be coated with a solvent resistant material (i.e., Corracoat)

Other

Steel tanks and lines should be provided with cathodic protection (i.e., sacrificial anode against corrosion). Note: anode to be inspected every two years.

Tank installation to include:

- 2-inch galvanized vent line complete with vent riser and vent cap to terminate 12 feet above finished grade
- 4-inch pump out riser complete with cam lock lockable collar and cap assembly to terminate 12 inches above finished grade
- level sensor alarm to be installed in the tank (with alarm or light) to provide warning to plant personnel of a spill

Installation of tank and lines to be pressure tested and certified by a contractor before acceptance by operating facility. Inspected by Fire Department as required.

APPENDIX 17 Monthly Inspection Checksheet

Date ______________

Every month, make a copy of this page and review the following items:

1. Good housekeeping is monitored throughout the facility. The condition is as follows:
(Whenever an area is *not* satisfactory, use the housekeeping form in appendix 15 to identify the issue, what needs to be done, who will do it and by what date.)

Area	*Check if satisfactory*
Office	☐
Prepress	☐
Pressroom	☐
Finishing	☐
Storage/warehouse	☐
Chemical storage	☐
Maintenance	☐
Grounds	☐
Other ______________________	☐
______________________	☐
______________________	☐

Area	*Check if satisfactory*
Appearance	
Loading docks are clean and free of stains that may indicate a past spill.	☐
Production area sinks are free of stains that may indicate solutions other than water have been discharged.	☐
The areas around sinks and wash-up locations are free of stains.	☐
Oil dry absorbent is swept-up and disposed of regularly.	☐
The plant is painted, windows cleaned, and flat surfaces are free of dust and clutter.	☐

2. Spills kits have been inspected. They are are in the proper locations and are complete with the appropriate spill response supplies. Yes ☐ No ☐

When you've completed this monthly review and have checked ***Satisfactory*** or answered ***Yes*** to each of the questions, file the completed page in your environmental file.

APPENDIX 18
Every Six Months Inspection Checksheet

Date ____________

Every six months, make a copy of this page and review the following items:

1. The monthly inspection checksheets (appendix 17) for the last six months have been completed and are stored in the environmental file. Yes ☐ No ☐
2. We have reviewed all personnel changes made in the last six months to ensure they don't affect our environmental efforts or performance. Yes ☐ No ☐
3. We have reviewed all equipment changes made in the last six months to ensure they don't affect our environmental efforts or performance. Yes ☐ No ☐
4. We have kept the same chemistry or product suppliers. (Review the Chemical Purchasing Authorization Form, appendix 9.) Yes ☐ No ☐
5. All copies of the TDG manifests are matched and filed. N/A ☐ Yes ☐ No ☐
6. TDG manifests older than than two years have been purged from the file. N/A ☐ Yes ☐ No ☐
7. Our neighbours have stayed the same in the last six months. Yes ☐ No ☐

When you've completed this six month inspection checksheet and have answered ***Yes*** to each of the seven questions, file the completed page in your environmental file.

APPENDIX 19

List of Policies and People Responsible

Policy	Person Who is Responsible for the Policy
Environmental	
Air emissions	
Capital purchasing	
Chemical storage	
Environmental inspections/audits	
Government inspections	
Hazardous waste	
Nonhazardous waste and waste reduction	
Chemical purchasing	
Spill and emergency response	
Training	
Water discharges and water conservation	
Updating this responsibility chart	

APPENDIX 20

National Pollutant Release Inventory Substances (NPRI) (as of 1998) *An amendment specifying 73 new substances for the 1999 reporting year is also presented.*

Name	CAS Number	Name	CAS Number	Name	CAS Number
Acetaldehyde	75-07-0	1,2-Butylene oxide	106-88-7	Cyclohexane	110-82-7
Acetone	67-64-1	Butyraldehyde	123-72-8	Decabromodiphenyl oxide	1163-19-5
Acetonitrile	75-05-8	C.I. Acid Green 3	4680-78-8	2,4-Diaminotoluene	95-80-7
Acrylamide	79-06-1	C.I. Basic Green 4	569-64-2	Dibutyl phthalate	84-74-2
Acrylic acid	79-10-7	C.I. Basic Red 1	989-38-8	o-Dichlorobenzene	95-50-1
Acrylonitrile	107-13-1	C.I. Disperse Yellow 3	2832-40-8	p-Dichlorobenzene	106-46-7
Allyl alcohol	107-18-6	C.I. Food Red 15	81-88-9	1,2-Dichloroethane	107-06-2
Allyl chloride	107-05-1	C.I. Solvent Orange 7	3118-97-6	Dichloromethane	75-09-2
Aluminum	7429-90-5	C.I. Solvent Yellow 14	842-07-9	2,4-Dichlorophenol	120-83-2
Aluminum oxide	1344-28-1	Cadmium	*	1,2-Dichloropropane	78-87-5
Ammonia - Total	*	Calcium cyanamide	156-62-7	Diethanolamine	111-42-2
Aniline	62-53-3	Carbon disulphide	75-15-0	Diethyl phthalate	84-66-2
Anthracene	120-12-7	Carbon tetrachloride	56-23-5	Diethyl sulphate	64-67-5
Antimony	*	Catechol	120-80-9	N,N-Dimethylaniline	121-69-7
Arsenic	*	Chlorine	7782-50-5	Dimethyl phthalate	131-11-3
Asbestos	1332-21-4	Chlorine dioxide	10049-04-4	Dimethyl sulphate	77-78-1
Benzene	71-43-2	Chloroacetic acid	79-11-8	4,6-Dinitro-o-cresol	534-52-1
Benzoyl chloride	98-88-4	Chlorobenzene	108-90-7	2,4-Dinitrotoluene	121-14-2
Benzoyl peroxide	94-36-0	Chloroethane	75-00-3	2,6-Dinitrotoluene	606-20-2
Benzyl chloride	100-44-7	Chloroform	67-66-3	Dinitrotoluene	25321-14-6
Biphenyl	92-52-4	Chloromethane	74-87-3	Di-n-octyl phthalate	117-84-0
Bis(2-ethylhexyl) adipate	103-23-1	Chromium	*	1,4-Dioxane	123-91-1
Bis(2-ethylhexyl) phthalate	117-81-7	Cobalt	*	Epichlorohydrin	106-89-8
Bromomethane	74-83-9	Copper	*	2-Ethoxyethanol	110-80-5
1,3-Butadiene	106-99-0	Cresol	1319-77-3	2-Ethoxyethyl acetate	111-15-9
Butyl acrylate	141-32-2	m-Cresol	108-39-4	Ethyl acrylate	140-88-5
i-Butyl alcohol	78-83-1	o-Cresol 1	95-48-7	Ethylbenzene	100-41-4
n -Butyl alcohol	71-36-3	p-Cresol	106-44-5	Ethyl chloroformate	541-41-3
sec-Butyl alcohol	78-92-2	Cumene	98-82-8	Ethylene	74-85-1
tert-Butyl alcohol	75-65-0	Cumene hydroperoxide	80-15-9	Ethylene glycol	107-21-1
Butyl benzyl phthalate	85-68-7	Cyanides	*	Ethylene oxide	75-21-8

APPENDIX 20
National Pollutant Release Inventory Substances (as of 1998)

Name	CAS Number
Ethylene thiourea	96-45-7
Formaldehyde	50-00-0
Hexachlorocyclopentadiene	77-47-4
Hexachloroethane	67-72-1
Hydrazine	302-01-2
Hydrochloric acid	7647-01-0
Hydrogen cyanide	74-90-8
Hydrogen fluoride	7664-39-3
Hydroquinone	123-31-9
Isobutyraldehyde	78-84-2
Isopropyl alcohol	67-63-0
p,p'-Isopropylidenediphenol	80-05-7
Isosafrole	120-58-1
Lead	*
Maleic anhydride	108-31-6
Manganese	*
Mercury	*
Methanol	67-56-1
2-Methoxyethanol	109-86-4
2-Methoxyethyl acetate	110-49-6
Methyl acrylate	96-33-3
Methyl tert-butyl ether	1634-04-4
p,p'-Methylenebis (2-chloroaniline)	101-14-4
Methylenebis(phenylisocyanate)	101-68-8
p,p'-Methylenedianiline	101-77-9
Methyl ethyl ketone	78-93-3
Methyl iodide	74-88-4
Methyl isobutyl ketone	108-10-1
Methyl methacrylate	80-62-6
Michler's ketone	90-94-8
Molybdenum trioxide	1313-27-5
Naphthalene	91-20-3
Nickel	*
Nitrate ion	*
Nitric acid	7697-37-2
Nitrilotriacetic acid	139-13-9
Nitrobenzene	98-95-3
Nitroglycerin	55-63-0
p-Nitrophenol	100-02-7
2-Nitropropane	79-46-9
N-Nitrosodiphenylamine	86-30-6
Peracetic acid	79-21-0
Phenol	108-95-2
p-Phenylenediamine	106-50-3
o-Phenylphenol	90-43-7
Phosgene	75-44-5
Phosphoric acid	7664-38-2
Phosphorus	7723-14-0
Phthalic anhydride	85-44-9
Propionaldehyde	123-38-6
Propylene	115-07-1
Propylene oxide	75-56-9
Pyridine	110-86-1
Quinoline	91-22-5
p-Quinone	106-51-4
Safrole	94-59-7
Selenium	*
Silver	*
Styrene	100-42-5
Styrene oxide	96-09-3
Sulphuric acid	7664-93-9
1,1,2,2-Tetrachloroethane	79-34-5
Tetrachloroethylene	127-18-4
Thiourea	62-56-6
Thorium dioxide	1314-20-1
Titanium tetrachloride	7550-45-0
Toluene	108-88-3
Toluene-2,4-diisocyanate	584-84-9
Toluene-2,6-diisocyanate	91-08-7
Toluenediisocyanate	26471-62-5
1,2,4-Trichlorobenzene	120-82-1
1,1,2-Trichloroethane	79-00-5
Trichloroethylene	79-01-6
1,2,4-Trimethylbenzene	95-63-6
Vanadium	7440-62-2
Vinyl acetate	108-05-4
Vinyl chloride	75-01-4
Vinylidene chloride	75-35-4
Xylene	1330-20-7
m-Xylene	108-38-3
o-Xylene	95-47-6
p-Xylene	106-42-3
Zinc	*

IMPORTANT INFORMATION FOR THE 1999 REPORTING YEAR

On April 24, 1999 an Amendment Notice with Respect to Substances in the National Pollutant Release Inventory for 1999 was published in the *Canada Gazette, Part I.* This amends the original 1999 NPRI Gazette Notice published on February 13, 1999, and specifies 73 new substances for the 1999 reporting year.

The addition of these substances will likely affect the following sectors, but **all** facilities in Canada must determine whether they are required to report.

- magnesium producers
- manufacturers and users of nonylphenol and nonylphenol ethoxylates
- non-metallic mineral producers
- petrochemical plants
- petroleum refineries
- power plants
- producers of paints and protective coatings
- pulp and paper producers
- PVC fabricating plants
- rubber industry
- steel mills
- smelters
- sour gas processing plants
- textile and leather manufacturers
- vegetable oil processing mills

Additional Substances in 1999

Substance Name	***CAS Nr.***	***Substance***	***CAS Nr.***
Acetophenone	98-86-2	Hydrogen sulfide	7783-06-4
Alkanes, C_{6-18}, chloro	68920-70-7	Iron pentacarbonyl	13463-40-6
Alkanes, C_{10-13}, chloro	85535-84-8	Isophorone diisocyanate	4098-71-9
Boron trifluoride	7637-07-2	Isoprene	78-79-5
Bromine	7726-95-6	Lithium carbonate	554-13-2
1-bromo-2-chloroethane	107-04-0	2-Mercaptobenzothiazole (MBT)	149-30-4
2-Butoxyethanol	111-76-2	1,1-Methylene bis (4-isocyanatocyclohexane)	5124-30-1
C.I. Direct Blue 218	28407-37-6	2-Methylpyridine	109-06-8
Calcium fluoride	7789-75-5	N-Methyl-2-pyrrolidone	872-50-4
Chlorendic acid	115-28-6	N-Methylolacrylamide	924-42-5
3-Chloro-2-methyl-1-propene	563-47-3	p-Nitroaniline	100-01-6
3-Chloropropionitrile	542-76-7	Paraldehyde	123-63-7
Crotonaldehyde	4170-30-3	Pentachloroethane	76-01-7
Cyclohexanol	108-93-0	Potassium bromate	7758-01-2
2,6-Di-t-butyl-4-methylphenol	128-37-0	Propargyl alcohol	107-19-7
3,3'-Dichlorobenzidine dihydrochloride	612-83-9	Sodium fluoride	7681-49-4
Dicyclopentadiene	77-73-6	Sodium nitrite	7632-00-0
Dimethyl phenol (Xylenol)	1300-71-6	Sulphur hexafluoride	2551-62-4
Dimethylamine	124-40-3	1,1,1,2-Tetrachloroethane	630-20-6
Diphenylamine	122-39-4	Tetracycline hydrochloride	64-75-5
Fluorine	7782-41-4	Tetraethyl lead	78-00-2
Formic acid	64-18-6	Triethylamine	121-44-8
Hexachlorophene	70-30-4	2,2,4-Trimethylhexamethylene diisocyanate	16938-22-0
Hexane	110-54-3	2,4,4-Trimethylhexamethylene diisocyanate	15646-96-5

Ozone Depleting Substances

Substance	***CAS Nr.***	***Substance***	***CAS Nr.***
CFC-11	75-69-4	Dichlorotrifluoroethane (HCFC-123) and all isomers[3]	34077-87-7
CFC-12	75-71-8	Halon 1211	353-59-3
CFC-114	76-14-2	Halon 1301	75-63-8
CFC-115	76-15-3	HCFC-22	75-45-6
Chlorotetrafluoroethane (HCFC-124) and all isomers[2]	63938-10-3	HCFC-122 (mixture)	41834-16-6
Chlorotrifluoromethane (CFC-13)	75-72-9	HCFC-141b	1717-00-6
		HCFC-142b	75-68-3

---

[2] The isomers include, but are not necessarily limited to, HCFC-124 (CAS # 2837-89-0), and HCFC-124a (CAS # 354-25-6).

[3] The isomers include, but are not necessarily limited to, HCFC-123 (CAS # 306-83-2) , and HCFC-123a (CAS # 90454-18-5).

Nonylphenol and its ethoxylates

Substance	*CAS Nr.*	*Substance*	*CAS Nr.*
Nonylphenoxy ethanol	104-35-8	(Nonylphenoxy)ethanol	27986-36-3
Nonylphenol[4]	104-40-5	Benzene, ethoxynonyl-	28679-13-2
Ethanol, 2-[2-(p4-nonlyphenoxy)ethoxy]-	20427-84-3	Oxirane, methyl-, polymer with oxirane, mono(nonylphenyl) ether	37251-69-7
n-Nonylphenol (mixed isomers)	25154-52-3	Ethanol, 2-[2-[2-[2-(4-nonylphenoxy)ethoxy]ethoxy]ethoxy]-	7311-27-5
Nonylphenol hepta(oxyethylene) ethanol	27177-05-5	Industrial nonylphenol	84852-15-3
Nonlyphenolnona(oxyethylene) ethanol	27177-08-8	Nonylphenol polyethylene glycol ether	9016-45-9

Nonlyphenol and nonylphenol ethoxylates are used in high volumes as detergents, emulsifiers, wetting agents and dispersing agents. Nonylphenol ethoxylate-containing products are used in many sectors, including textile processing, pulp and paper processing, paints, resins and protective coatings, oil and gas recovery, steel manufacturing, pest control products and power generation. As well as being used in industry, a variety of cleaning products, degreasers and detergents are also available for institutional or domestic use. The products have numerous applications, including controlling deposits on machinery, cleaning equipment, scouring fibres, wetting and de-wetting agent, in dyeing, and in machine felt cleaning and conditioning and finishing.

The final list will be posted on the Internet at the NPRI Web site:

http://www.ec.gc.ca/pdb/npri/

---

[4] Note that Environment Canada has identified octylphenol - also know as 4-tert-octylphenol or 4-(1,1,3,3-tetramethylbutyl) phenol, CAS # 140-6609 - as a substance for possible future addition to the NPRI, since it is of toxicological relevance and may be used as an alternative to nonylphenols. It was not put forward to the Work Group in sufficient time for it to be considered for the 1999 reporting year.

APPENDIX 21
Accelerated Reduction/Elimination of Toxics Program (ARET)

The following is the ARET list of candidate substances for action. There is evidence that these substances 1) have the potential to have harmful effects on human, animal, or plant life; 2) tend to degrade very slowly in the environment; and/or 3) tend to accumulate in living organisms.

This listing is meant as a preliminary guide to priorities, and is not meant to imply that actual harm is currently being caused by these substances. Decisions concerning priority for action will be made by the managers of emitting facilities based on additional criteria specific to each situation.

Property	List A-1	List A-2*	List B-1	List B-2	List B-3
Toxicity	Yes	Yes	Yes	Yes	Yes
Bioaccumulation	Yes	Yes	Yes	No	No
Persistence	Yes	Yes	No	Yes	No

*ARET consensus was not reached.

The substances have been categorized by chemical grouping and are accompanied by their Chemical Abstract Service Registry Number (CASRN).

LIST A-1 (meet or exceed criteria for toxicity, bioaccumulation and persistence)

ARET's vision for substances on this list is the virtual elimination of discharges into the environment from human activities. The short-term goal is for significant reduction in discharges.

	CASRN
Polychlorinated Biphenyls (PCBs)	
Polycyclic Aromatic Hydrocarbons (PAHs) as a group	
(The following specific PAHs met or exceeded the criteria for List A-1.)	
Benz(a)anthracene	56-55-3
Benzo(a)pyrene	50-32-8
Benzo(e)pyrene	192-97-2
Benzo(b)fluoranthene	205-99-2
Benzo(j)fluoranthene	205-82-3
Benzo(k)fluoranthene	207-08-9
Benzo(g,h,i)perylene	191-24-2
Chrysene	218-01-9
Dibenz(a,h)anthracene	53-70-3
Dibenzo(a,i)pyrene	189-55-9
Dibenz(a,j)acridine	224-42-0
7H-dibenzo(c,g)carbazole	194-59-2
Fluoranthene	206-44-0
Indeno(1,2,3-c,d)pyrene	193-39-5
Perylene	198-55-0
Phenanthrene	85-01-8
Pyrene	129-00-0

	CASRN
Nitro-PAHs	
1,6-dinitropyrene	42397-64-8
1,8-dinitropyrene	42397-65-9
Metal compounds	
*Methyl mercury	22967-92-6
Tributyltin	688-73-3
Chlorinated organics	
Hexachlorobenzene	118-74-1
alpha-hexachlorocyclohexane	319-84-6
gamma-hexachlorocyclohexane	58-89-9
4,4'-methylenebis(2-chloroaniline)	101-14-4
Octachlorostyrene	29082-74-4
Pentachlorophenol	87-86-5
2,3,7,8-tetrachlorodibenzofuran	51207-31-9
2,3,7,8-tetrachlorodibenzo-p-dioxin	1746-01-6

*For prevention/control actions, mercury should be addressed (see List B-2)

LIST A-2 (ARET members were unable to agree on the appropriate vision and resulting reduction targets for these substances)

ARET's goal for substances on this list is for the reduction of discharges to levels that are insufficient to cause harm. The short-term goal is for significant reductions in discharges.

	CASRN
*1,4 dichlorobenzene	106-46-7
**Cadmium compounds (respirable & soluble inorganic forms)	

*The toxicity criterion was met for possible carcinogenicity by accepting IARC (International Agency for Research on Cancer) classification of "possible human carcinogen."
**The selection process was unable to take into account specific metal compounds, and therefore scores for metals were based on a composite score for several metal species. For cadmium, actions may be tailored to such compounds as CdCO3, Cd(OH)2, CdCl2, CdO, and CdSO4. The concept of virtual elimination of discharges for metals is under discussion and was not resolved by ARET.

LIST B

For the List B substances, the vision is reduction of discharges to levels that are insufficient to cause harm. The short-term goal is for significant reductions in discharges.

LIST B-1 (meet or exceed criteria for toxicity & bioaccumulation)

PAHs with data screened in this category:	CASRN
Anthracene	120-12-7
7,12-dimethylbenz(a)anthracene	57-97-6
Dimethylnaphthalene	28804-88-8
Other	
bis(2-ethylhexyl)phthalate	117-81-7
*Tetraethyl lead	78-00-2

Chlorinated organics	CASRN
3,3' dichlorobenzidine	91-94-1
Hexachlorocyclopentadiene	77-47-4
2,4,6-trichlorophenol	88-06-2

*Degrades to lead, which is persistent (see List B-2).

LIST B-2 (meet or exceed persistence & toxicity criteria)

PAHs with data screened in this category:	CASRN
Benzo(a)fluorene	238-84-6
Benzo(b)fluorene	30777-19-6
Dibenz(a,h)acridine	226-36-8
Chlorinated organics	
alpha-chlorotoluene	100-44-7
bis(2-chloroethyl)ether	111-44-4
Bromodichloromethane	75-27-4
Carbon tetrachloride	56-23-5
Chloroform	67-66-3
Chlorodibromomethane	124-48-1
1,2 dichloroethane	107-06-2
Methylene chloride	75-09-2
1,1,2,2-tetrachloroethylene	127-18-4
2,3,4,6-tetrachlorophenol	58-90-2

Metal compounds	CASRN
Arsenic (inorganic)	N/A*
Asbestos	1332-21-4
Beryllium	7440-41-7
Chromium (Cr6+)	N/A*
Cobalt (inorganic, soluble)	N/A*
Copper (inorganic salts)	N/A
**Lead (all forms except alkyl)	N/A*
***Mercury (elemental and inorganic)	N/A*
Nickel (inorganic, respirable, soluble)	N/A*
Silver (soluble inorganic salts)	N/A*
Uranium (inorganic,respirable,soluble)	N/A*
Zinc (inorganic, respirable, soluble)	N/A*
Other	
o-anisidine	90-04-0
Cyanides	57-12-5
4,6 dinitro-o-cresol	534-52-1
1,4 dioxane	123-91-1
Ethylene oxide	75-21-8
2-naphthylamine	91-59-8
2-nitropropane	79-46-9
Thiourea	62-56-6

*CASRN not applicable. The selection process was unable to take into account specific metal compounds, and therefore scores for metals were based on a composite score for several metal species.
**See also Tetraethyl lead on List B-1
***See also Methyl mercury on List A-1

LIST B-3 (meet or exceed toxicity criterion)

	CASRN
Chlorinated organics	
bis(chloromethyl) ether	542-88-1
Epichlorohydrin	106-89-8
1-bromo-2-chloroethane	107-04-0
1-chloro-4-nitrobenzene	100-00-5
1,2-dibromo-3-chloropropane	96-12-8
1,2-dichlorobut-3-ene	760-23-6
2,4-dichlorophenol	120-83-2
1,3 dichloropropene	542-75-6
1,1,2-trichloroethylene	79-01-6
Nitrosamines	
N-nitrosodimethylamine	62-75-9
N-nitrosodiphenylamine	86-30-6
N-nitroso-di-n-propylamine	621-64-7
Aromatics	
4-aminoazobenzene	60-09-3
4-aminobiphenyl	92-67-1
Aniline	62-53-3
Benzene	71-43-2
Benzidine	92-87-5
Dimethylphenol (mixed isomers)	1300-71-6
2,6 dimethylphenol	576-26-1
2,4 dinitrotoluene	121-14-2
2,6 dinitrotoluene	606-20-2
1,2 diphenylhydrazine	122-66-7
2-methylpyridine	109-06-8
Phenol	108-95-2
Toluene diisocyanates	26471-62-5

	CASRN
Other	
Acetaldehyde	75-07-0
Acetamide	60-35-5
Acrolein	107-02-8
Acrylamide	79-06-1
Acrylonitrile	07-13-1
1,3 butadiene	106-99-0
Chlorine dioxide	10049-04-4
n-dodecane	112-40-3
Ethanol	64-17-5
Ethylene dibromide	106-93-4
Ethylene thiourea	96-45-7
Formaldehyde	50-00-0
Hydrazine	302-01-2
Hydrogen sulphide	7783-06-4
Methyl isobutyl ketone	108-10-1
4-nitrosomorpholine	59-89-2
Quinoline	91-22-5
Tetramethylthiuram disulphide	137-26-8
Vinyl bromide	593-60-2

APPENDIX 22
Model Sewer Discharge By-Law

Examples of various prohibited/restricted substances that can not be discharged into the sewers as identified by various Model Sewer Discharge By-Laws are presented in this Appendix (Source: City of Saint John, NB; Charlottetown, PEI; HRM, NS; and Nova Scotia Model Sewer Discharge By-Law).

No person shall discharge, cause to be discharged, or continue to discharge, any storm water, surface water, ground water, roof run-off, sub-surface drainage, cooling water or unpolluted industrial waters into any sanitary sewer or the like.

Except as hereinafter provided, no person shall discharge, cause to be discharged, or continue to discharge any of the following into any drain or sewer service connection connecting with the drainage or sewerage system of the city:

- liquid or vapour having a temperature higher than 150^{o}F (66^{o}C);
- ashes, cinders, sand, earth, mud, straw, metal, glass, pigments, rags, textiles, tar, wood, wood products, paper fibre and plastics, or other viscous or colloidal substance capable of causing obstruction to the flow in sewers or other interference with the proper operations of the sewage treatment plants;
- water or wastes which may contain more than 150 parts per million by weight of fat, oil or grease of animal or vegetable origin, or 15 parts per million of oil or grease of mineral origin; or tar;
- waters or wastes having a pH lower than 5.5 or higher than 9.5 (in Saint John, NB, pH lower than 6.0 is prohibited) or where the pH becomes lower than 5.5 or higher than 9.5 if the matter is diluted by any liquid, or having any other corrosive property capable of causing damage or hazard to structures, equipment and personnel;
- gasoline, benzene, naptha, fuel oil, motor oil, acetone, solvents, or other flammable or explosive liquid, solid or gas;
- waters or wastes containing cyanides, chromium, cadmium, copper, or sulphides; or containing a toxic or poisonous substance in sufficient quantity to injure or interfere with any sewage treatment or constitute a hazard to humans or animals;
- noxious or malodorous gas or substance capable of creating a public nuisance;
- waters or wastes containing more than 50 parts per billion of phenolic equivalents in Saint John, NB - as different levels are regulated by different municipalities, contact your local Municipal Clerk's office;

APPENDIX 22
Model Sewer Discharge By-Law

- waters or wastes containing substances or such character and quality that unusual expense or attention is required to handle such materials at any sewage works under the control of the City;

- waters or wastes containing more than 1500 parts per million of chlorides or sulphates; and

- waters or wastes having a five day Biochemical Oxygen Demand or Suspended Solids concentration greater than 300 parts per million by weight (in NB, 400 ppm).

PLEASE obtain a complete copy of your Sewer Discharge By-Law from the local Municipal Clerk's office (See Appendix 1). If your area does not have a Sewer Discharge By-Law, it would be prudent to follow the Sewer Discharge By-Law enforced by a city that is closest to your printing operation.

APPENDIX 23
VOC Emission Performance Targets as a Function of Printing Press Type

	Allowable Fraction of Baseline Uncontrolled VOC Amount for a Printing Press or Printing Line	Corresponding Reduction in Uncontrolled VOC Amount
Flexography	.10	90%
Publication Rotogravure	.10	90%
Packaging and Product Rotogravure	.10	90%
Heatset Web Lithography	.10	90%
Coldset Web Lithography	.30	70%
Sheet-fed Lithography	.30	70%
Webfed Letterpress	.30	70%
Sheetfed Letterpress	.30	70%
Rotoscreen	.30	70%

Source: Canadian Council of Ministers of the Environment (August 1998 - Draft). *Environmental Code of Practice for the Reduction of Volatile Organic Compound Emissions from the Commercial/Industrial Printing Industry.* CCME Management Plan Initiatives V308 and V613.

Resources

Section 7: Resources

World Wide Web Sites:

Canadian Printing Industries Association	**www.cpia-aci.ca/indinfo.html**
Envision Compliance Limited	**www.envisioncompliance.com**
NAPL	**www.napl.org/**
New Brunswick Printing Industries Association	**http://198.164.135.159/nbpia/home.html**
Ontario Printing and Imaging Association (OPIA)	**www.tube.com/opia**
Printers' National Environmental Assistance Center (PNEAC)	**www.inhs.uiuc.edu/pneac/pneac.html**
Printing Industries of America Inc.	**www.printing.org/**
Screen Printing and Graphic Imaging Association International (SGIA)	**www.sgia.org**
The Graphic Arts Technical Foundation (GATF)	**www.gatf.lm.com**